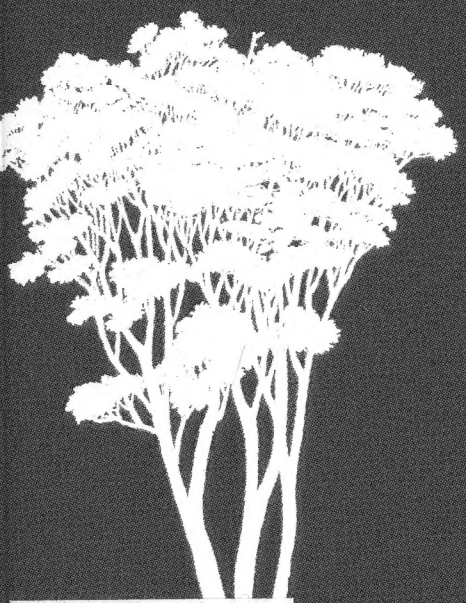


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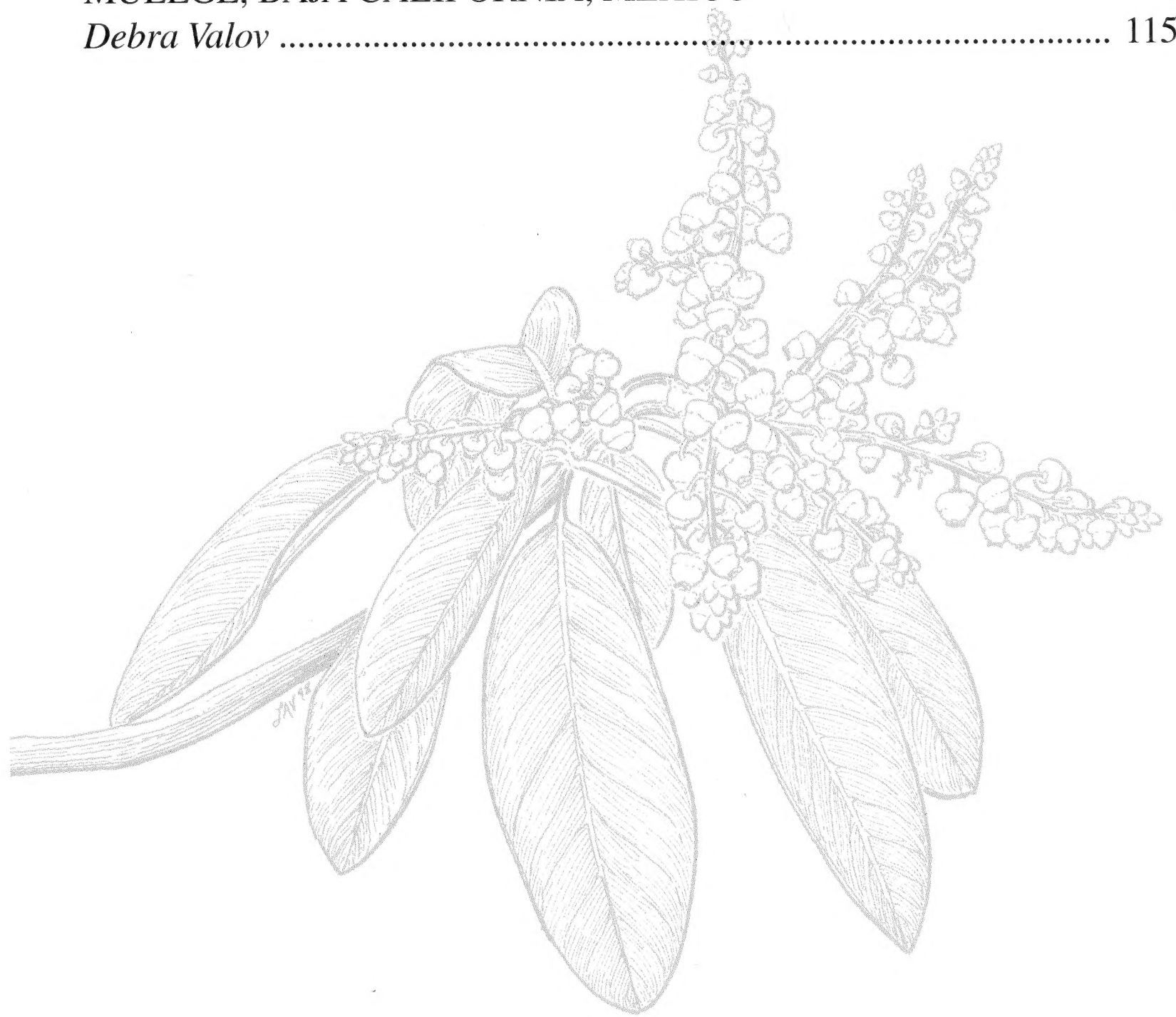


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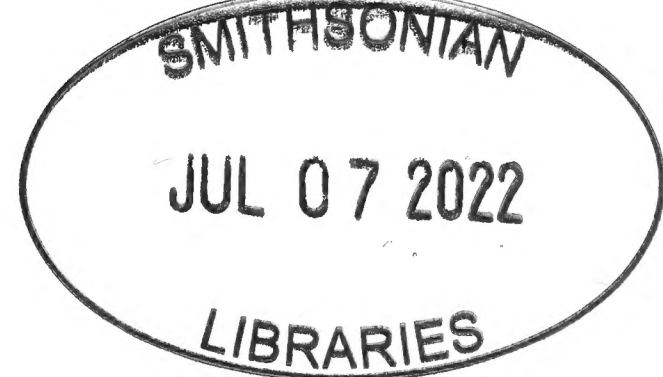
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AN ANNOTATED CHECKLIST OF THE VASCULAR PLANTS OF MULEGÉ, BAJA CALIFORNIA, MEXICO

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ABSTRACT

The arid Central Gulf Coast ecoregion, characterized mainly by sarcocaulous scrub, is a poorly studied area. This paper addresses this knowledge gap with an annotated checklist of the vascular plants of the Mulegé area (Bahía Concepción to Punta Chivato; 397 km²), which was compiled over at least 267 field days during 15 field seasons between 2003 and 2019. The inventory presents 411 taxa (330 species, 81 infraspecies) in 82 families and 288 genera. There are 342 taxa native to the peninsula, of which 78 are endemic or near-endemic taxa. Six species are included on Mexico's protected species list (NOM-059) and two are on the IUCN Red List. The extensive loss of the mangrove thickets along the Mulegé estuary and the rapid spread of the invasive species *Cenchrus ciliare* L. (Poaceae) are immediate ecological concerns compounded by the more long term effects of climate change, sea level rise and development. While this study shares up to 74% of families and 66% of the genera of several other regional floras for the peninsula, at the species level it shares between just 23% and 63% with them, highlighting Mulegé's local floristic diversity.

RESUMEN

La árida ecorregión nombrada la Costa Central del Golfo, caracterizada principalmente por matorrales sarcocaulos, es un área poco estudiada. Este artículo aborda esta carencia de conocimiento con un inventario anotado de las plantas vasculares de la región (de Bahía Concepción a Punta Chivato; 397 km²) cuyos datos fueron recopilados en al menos 267 días de trabajo de campo durante 15 temporadas entre 2003 y 2019. El inventario incluye 411 taxones (330 especies y 81 infraespecies) en 82 familias y 288 géneros. Hay 342 taxones nativos a la península, de los cuales 78 taxones son endémicos o casi-endémicos. Hay seis especies incluídas en la lista de especies protegidas por la ley mexicana (NOM-059) y dos que están en la Lista Roja de IUCN. La pérdida extensiva de los manglares a lo largo del Estero Mulegé además de la rápida propagación de la especie invasora *Cenchrus ciliare* L. (Poaceae) son las principales preocupaciones de conservación, las cuales son agravadas por los efectos a largo plazo del cambio climático, el aumento del nivel del mar y el desarrollo. Mientras este estudio comparte hasta 74% de las familias y 66% de los géneros de otras floras regionales para la península, al nivel de la especie comparte solamente entre 23 y 63% con ellos, subrayando la diversidad florística local.

Key Words: central gulf coast, conservation, endemism, floristics, Sonoran Desert.

Mulegé, Baja California Sur is a small town on the Gulf of California (Fig. 1) characterized mostly by desert scrub and with areas supporting riparian, coastal wetland and dune vegetation. It is located within the Central Gulf Coast (or Gulf Coast Desert) ecoregion, one of the peninsula's 13 phytogeographical ecoregions and one of the six desert ecoregions (González-Abraham et al. 2010).

The Central Gulf Coast region encompasses a narrow strip of land east of the peninsular ranges, extending from Bahía de los Ángeles southward to the southern end of La Paz (Shreve and Wiggins 1964; Wiggins 1980; González-Abraham et al. 2010). It includes the larger islands of Ángel de la Guarda and Tiburón, many of the smaller Gulf islands to the south, and a narrow strip along the coast of the state of Sonora between the end of the Lower Colorado River and the Río Yaqui. González-Abraham et al. (2010) describes the ecoregion's landscape as being characterized by bare hills below 200–300 m elevation with *arroyos* (canyons, ravines and/or seasonal water courses) bordered by boulders and sandy

deposits. Vegetation of this narrow coastal margin consists primarily of xerophytic elements of the sarcocaulous Sonoran Desert scrub, as described by Shreve and Wiggins (1964) and Wiggins (1980).

The Mulegé region includes a permanent freshwater oasis, numerous seasonal watercourses, and disjunct communities of mangrove thickets, coastal wetlands and dunes (Valov 2019a). As one travels west into the Mulegé Valley and climbs above about 150 meters into the Sierra de Guadalupe (which forms the area's western and southwestern boundaries), the vegetation begins to intergrade with that of the Sierra de la Giganta ecoregion.

Notable Features of the Region

Mulegé (also known as Heróica or H. Mulegé) is located in the dry bed and along the steep banks of a river canyon, with subterranean aquifers throughout the Mulegé Valley providing fresh water for the entire region (Valov 2019b). At the *Ojo (de agua)* (spring or seep) about 0.75 km directly southwest of

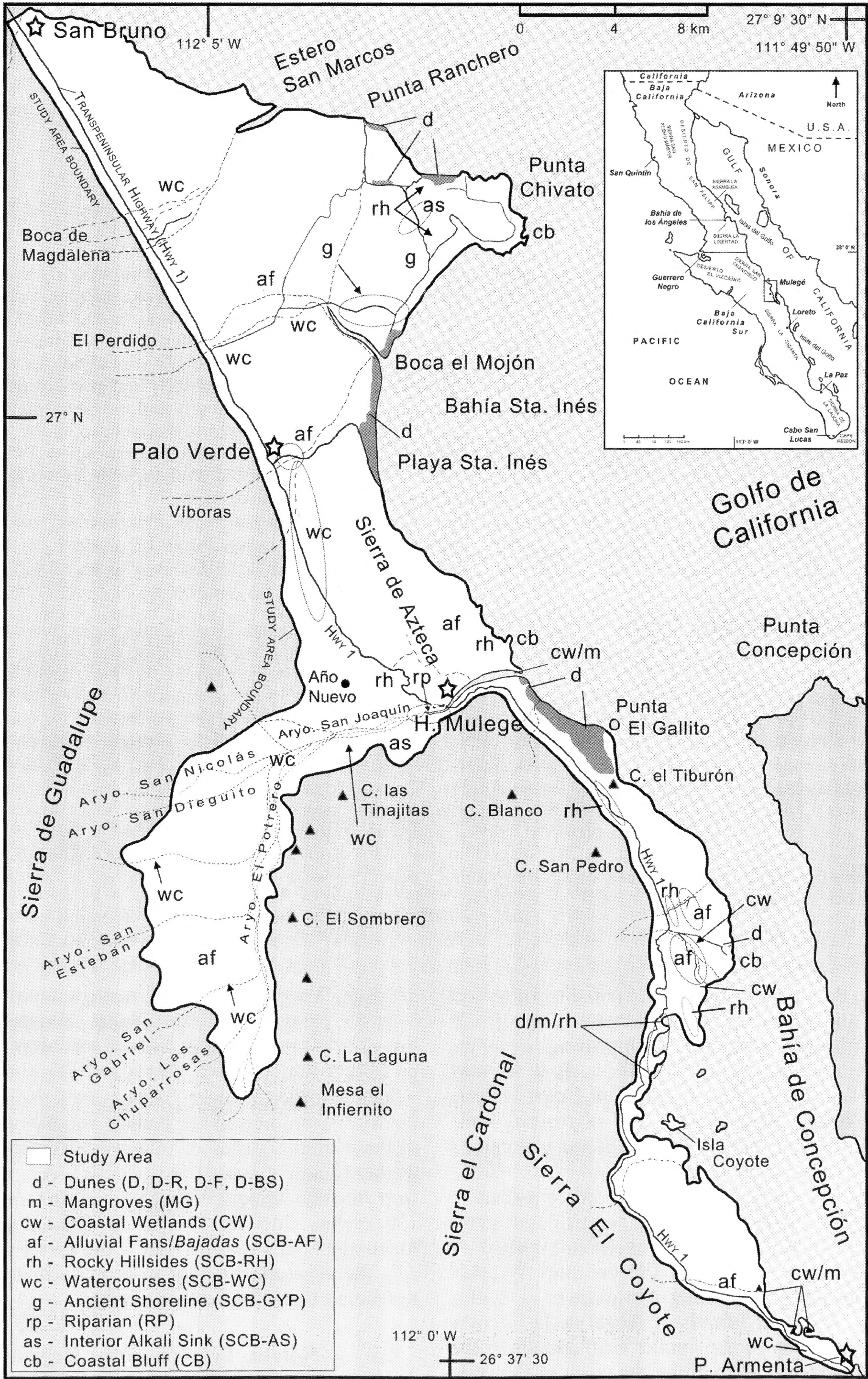


FIG. 1. Map of the study area showing major collection locations by geomorphic formation. Inset shows the Baja California peninsula. Key corresponds to plant associations described in the text and used in the checklist. General coordinates for named locations in the text and on this map can be found in Appendix 1.



FIG. 2. Photos from the study area. A. Aerial view of the mouth of the Mulegé estuary in 2010 after the on-going loss of mangrove coverage over a five year period. B. View of the Mulegé Valley, looking towards the mountain ranges that form its west side. C. View northward along Santa Inés beach and bay, with the Punta Chivato peninsula in the distance. D. View northward of Playa El Requesón, from the western shore of Bahía Concepción, with the Concepción peninsula in the far distance. E. Coastal wetland (mangroves, salt marsh and salt pan) just behind the beach strand at Playa Burro, with the volcanic crags of the western escarpment of Bahía Concepción looming above. F. View westward of a broad alluvial fan and sandy arroyo from a rocky hillside at Punta Sueños shortly after heavy rainfall from tropical storm Paul in late 2012.

the arch at the town's main entrance (Google Earth 2013a), water from the aquifer bubbles to the surface to form the river, which is actually more like a creek. Surrounding the *Ojo* and river is an extensive palm oasis. This date orchard covers 64 ha (158 acres)

(Berkeley Natural History Museums n.d.) and dates to the late 16th century missionaries. The palm oasis is crisscrossed by seasonal waterways that flow rapidly during flashfloods and where water may sit in ditches and evaporate over a period of days to

months under the shade of the palm trees. The only standing water is in the river itself, and in several small wetland areas newly created after excavations in 2014–2015 were made within the oasis that exposed the shallow water table.

From the *Ojo*, the river flows approximately 1.5 km, through a small dam near the Misión de Santa Rosalía de Mulegé (referred to hereafter as the Mission), and enters the upper reach of the Estero Mulegé (Mulegé estuary) just under the highway. The estuary extends eastward approximately 3.3 km along a canyon formed by the Sierra Azteca on the north and a series of smaller volcanic hills on the south before entering the Gulf of California (Fig. 2A; Crumpton 2009). Cerro El Sombrerito, a volcanic rock promontory at the mouth of the river, is connected to the north shore by a rocky, sandy spit of land; a lighthouse (referred to hereafter as *el Faro*) sits on the summit.

West: the Mulegé Valley. The valley (Fig. 2B) is approximately 14 km long by 9 km wide and covers approximately 79 km² (Berkeley Natural History Museums n.d.). Alluvial fans from the adjacent mountains flow down into the valley, and dozens of seasonal watercourses with loose, sandy silt or gravel cut across the gently sloping valley floor.

While there are at least 24 arroyos from the mountains feeding the valley (Crumpton 2009; Google Earth 2013a), the two largest and most influential (especially during flash floods) are the Arroyo San Gabriel, which enters the valley from the southwest near Rancho La Trinidad, and Arroyo El Potrero, which is fed by the San Gabriel, as well as a number of smaller canyons in the south of the valley. The two main arroyos coalesce in the southern portion of the valley and Arroyo El Potrero then continues to flow north and then eventually east through town and into the estuary and gulf.

North: San Bruno. The area between Mulegé and San Bruno is very sparsely populated, with a few ranches and the small town of Palo Verde that is located at the highway junction to Punta Chivato. This entire zone lies mainly in the outflow plain of the Arroyo San José de Magdalena and two other major arroyos originating in the mountains, as well as at least 16 other smaller canyons and ravines. These all give rise to hundreds of dry, braided streamlets that traverse a 26 km stretch north to south (Google Earth 2013b), any number of which are subject to infrequent, seasonal flash flooding. This gently sloping watershed of mostly open desert scrub is interrupted by one or two low-lying rocky outcrops and meets the coast both north and south of Punta Chivato.

Northeast: Punta Chivato. This region can best be described as a small peninsula ending in four smaller rocky outcrops (Punta Mezquitito, P. Cacarizo, P. Cerotito on the southern and eastern sides, and P. Chivato on the northern side) with the entire

peninsula collectively referred to as Punta Chivato. The points are formed by a series of low (≤ 100 m), steep-sided mesas interspersed with numerous narrow ravines (Google Earth 2013b). Much of the northern and eastern coastline is formed by steep rocky cliffs, but there are also four sandy beaches, three on the north shore and one on the east, along with one extensive dune system on the northwestern coast. This is a sparsely populated area with no permanent surface water and only limited aquifers that are facing overexploitation by luxury home and hotel developments in the area (M. Johnson, Williams College, personal communication).

Between Punta Chivato and the mouth of the Mulegé River is Bahía Santa Inés (Fig. 2C). The bay's shoreline is divided by an estuary just south of the housing developments and main entrance road for the Punta Chivato beach (called Shell Beach by foreign residents) and Playa Santa Inés. The latter is an approximately 5.5 km long, unbroken stretch of beach strand (Berkeley Natural History Museums n.d.) with an extensive system of low dunes (< 2 m high) that become increasingly narrower towards the southern end of the beach where it is bordered on the west by the northern reaches of the Sierra Azteca range. These low (< 250 m) jagged hills extend for about twelve km from Playa Santa Inés to meet the north shore of the Mulegé River (Crumpton 2009). The peaks and mesas of the range, which extend from the coast about 7 km east to west, form much of the northeastern rim of the Mulegé arroyo and valley.

South: Bahía Concepción. To the south of Mulegé, the Gulf coastline enters Bahía de Concepción (Fig. 2D), a 39 km long, relatively shallow bay (< 100 m) bounded on the west by a sharp fault escarpment (Berkeley Natural History Museums n.d.) that, in many places, plunges abruptly into the water (Fig. 2E). In contrast, the eastern limit of the bay is formed by Punta Concepción and the Sierra los Gavilanes peninsula, which is composed of lifted fault blocks that have eroded to form enormous, deep alluvial fans that gradually descend to the shoreline (Minch et al. 1998). The eastern side of the bay (not part of the study area) is for the most part uninhabited and shows minimal human impact, with just a few seasonal fish camps (D. Valov, personal observation). The bay's western shoreline, though very sparsely populated (a few inland ranches and permanent residences are dispersed along the coastline), is heavily impacted by the seasonal presence of a winter-spring tourist population concentrated in approximately twelve small beaches. All fresh water around Bahía Concepción either comes from ranch wells or is hauled in from H. Mulegé (D. Valov, personal observation).

Geology and Soils

Soils are principally of volcanic origin. According to geological maps (Servicio Geológico Mexicano 1997, 1998, 2002a, 2002b), the surrounding moun-

tains and rocky outcrops are composed of both Tertiary and Quaternary basaltic outcrops, as well as andesitic and basaltic breccias dating between 16.4 mya and 1.68 mya. Polymictic conglomerates dating from 1.68 mya to 0.01 mya form much of the alluvial fans and plains (Fig. 2F) between the mountains and the coast both north and south of H. Mulegé while Quaternary alluviums dating 0.01 mya cover most of the Mulegé Valley floor and all of the dry river beds in the region. Nearby Punta Chivato provides a unique combination of soil types compared with other locations within the study area. According to Johnson (2002), much of the Chivato peninsula is of limestone origin uplifted from the gulf floor. The limestone was later overlain in places with volcanic deposits (basalt, rhyolites and andesites) (Servicio Geológico Mexicano 2002b). The surrounding area also has areas of ancient seabed with secondary gypsum deposits on the southeastern portion (W. Hirt, Diablo Valley College, personal communication).

Climate

According to Köppen's system of climate classification, most of the Baja California peninsula is arid or semi-arid (Roberts and Ezcurra 2012). These authors note that the arid Central Gulf Coast ecoregion receives the majority of precipitation from southern monsoonal storms of Pacific or Gulf origin during the summer; lighter, cooler winter rains from northern Pacific storms that affect the northern peninsula are rare.

However, Mulegé is located in the zone where the summer's southern Pacific/Gulf storm pattern overlaps with that of the northern Pacific's winter storm pattern, resulting in infrequent late summer monsoons and/or infrequent winter rains. According to Roberts and Ezcurra (2012), the mean annual precipitation in the Mulegé region is 100–150 mm, with 30–35% of this occurring in the winter (January and February) and 20–25% in late summer or fall (September to November). Tropical precipitation usually occurs from August to November, during the eastern Pacific hurricane season, though these rains are infrequent to absent during any given season, and do not necessarily occur annually. Droughts lasting multiple years are common, as are destructive flash flood events provoked by slow-moving, moisture laden tropical storms and hurricanes lingering over the mountain ranges. From 2001 to 2019, the Mulegé region has been strongly affected by six named tropical storms and four hurricanes of Category 1 or 2 on the Saffir scale (The Weather Company 2017).

Previous Studies

Peninsula-wide publications. While there is a growing body of botanical work for the peninsula, there remain large areas yet to be fully described.

Many of these studies have been dedicated to the unique and underexplored areas of the peninsula, such as the Gulf and Pacific islands (Rebman et al. 2002; Vanderplank et al. 2018), mountain top “sky islands” (Bullock et al. 2008; Wehncke et al. 2012) and the peninsula's oasis areas (Arriaga et al. 1997; León de la Luz and Domínguez-Cadena 2006). Exploration and research in many of the regions mentioned has historically been limited because of their remoteness, but some recent multidisciplinary expeditions have led to new records for the peninsula and to increased understanding of the peninsula's botanical history and endemism.

Additional fieldwork has produced floristic publications such as those for the Punta Banda peninsula near Ensenada (Mulroy et al. 1979), the Sierra de la Giganta (León de la Luz et al. 2008), the Sierra San Pedro Mártir (Thorne et al. 2010), the Vizcaino Desert (León de la Luz et al. 1995), and the San Felipe Desert (Delgadillo-Rodríguez and Macías-Rodríguez 2002). Two short bilingual plant field guides present a small number of the common plants for the areas of the Sierra de San Francisco (Valov 2007) and Mesa del Rincón, San Ignacio (Valov 2012). With increasing anthropogenic threats to wild areas, especially those near existing population centers, there have been a number of regional studies hoping to document the vegetation and floristic diversity of critical areas before they might be lost to science. These include: the San Quintín region (Vanderplank 2011), the Punta Colonet area (Harper et al. 2010), and the peninsula's many oases (Arriaga et al. 1997; León de la Luz and Domínguez Cadena 2006). Floristic analysis of six regions in Baja California's Mediterranean region and conservation priorities are addressed by Vanderplank et al. (2017).

Central Gulf Coast publications. In spite of the growing body of botanical works, there still exists a paucity of research for most of the Central Gulf Coast region. Published works are primarily focused on the southernmost extreme of the ecoregion, or the Gulf Islands. Pérez-Navarro (1995) looked at coastal vegetation near the tip of the peninsula and lists 137 taxa for coastal dunes, salt marshes, mangroves and rocky hillsides. Johnson (1977) conducted a survey of coastal vegetation (beaches and dunes) on the southern peninsula along both the Pacific and Gulf, but made only a passing mention of Mulegé in one table, and did not actually sample any plots in the area. Perrea et al. (2005) studied functional morphology of a small research area of sarcocaulous scrub near La Paz Bay and listed just 41 taxa of shrubs, perennials and cacti. A study along the central and southern Gulf coast region produced a coastal flora with 72 families, 219 genera and 399 taxa (Pérez-Navarro et al. 1999). These authors note that the least studied zones were those around both Loreto and Mulegé, while the stretch between Volcán Tres Vírgenes (NE of Santa Rosalía) and Bahía Concepción was the least explored. Rebman et al.

(2002) revised available floristic lists for 20 major islands of the Gulf of California (located within the Central Gulf Coast ecoregion) that were previously published by Moran (1983), adding taxa from new collections, especially from the southern islands. They identified 97 families, 331 genera, and 695 taxa, 43% of which were found in just five families: Asteraceae, Poaceae, Fabaceae, Euphorbiaceae, and Cactaceae. They note that given the difficulties of accessing the islands and their rough terrain, the islands have been poorly explored. That, along with climate variability means the island plant diversity may well be even greater than is currently known. At the time of its publication, the checklist of the Sierra de la Giganta ecoregion compiled by León de la Luz et al. (2008) used the boundaries circumscribed by Shreve and Wiggins (1964), and later Wiggins (1980), which reached only as far north as Loreto and the Comondús (approximately 120 km south of Mulegé). As a result, there were no voucher specimens in the checklist from the Mulegé watershed (the mountains directly to the west of town and Bahía Concepción). Since that publication, a new model of vegetation mapping has extended the ecoregion northward, well beyond Mulegé, to where it coalesces with the Vizcaíno Desert near San Ignacio (González-Abraham et al. 2010). This leaves a large gap in the knowledge base for the entire mountain range. While the Mulegé area has been included in at least one large scale project, the area was not well-studied. Peinado-Lorca et al. (2009) conducted a large scale phytosociological study that took samples along the entire Pacific Coast from Alaska to Baja California, but only nine of the project’s 965 *relevé* sites, mostly of coastal vegetation, fell within this project’s current study area. Finally, a plant survey from around Bahía Concepción was compiled for the government (Comisión Nacional para el Conocimiento y Uso de la Biodiversidad 2008), which included 107 vascular plants. However, it contains a number of inaccuracies, the most notable being the five taxa listed that are not even known to occur on the Baja California peninsula.

Historical Collections

Database searches from 2009–2014 for collections within the study area resulted in 425 collections from 65 different individuals representing 184 taxa that spanned the period from 1887–2012 (Table 1). Almost half of these vouchers were made by just nine collectors. Only 41 of these specimens were collected before the 1970s. This is not surprising, given that until then access to the region was limited due to the lack of paved roads, and traversing the peninsula’s rough terrain required an arduous journey that could take weeks or months. The oldest collections are from Edward Palmer in 1887. Joseph N. Rose made one collection in 1921, as did Ivan M. Johnston, who has a second collection from 1935. In the early 1930s, Darley F. Howe, Forest Shreve, and

TABLE 1. MAJOR COLLECTORS FOR THE MULEGÉ AREA.

Collector	# Collections	# Taxa
D. Valov	667	366
T. F. Daniel	52	45
J. P. Rebman	36	30
A. C. Sanders	28	28
D. F. Howe	19	19
R. Moran	19	19
Hodgson	17	15
Gander	13	13
Gallagher	12	12
De Groot	12	12

Ira Wiggins each collected a small number of vouchers, with Annetta Carter following suit in 1941. Reid Moran also contributed vouchers on each of his four visits between 1959 and 1971. Once the transpeninsular highway was completed in 1973, accessibility to the peninsula was greatly expanded, and the number of specimens followed suit. Both Thomas F. Daniel and Andrew C. Sanders were the most prolific collectors from the area in the mid to late 1980s (on the Third ASU Herbarium Expedition to Baja California, Jan 1983), while Jon P. Rebman dominated the 1990s. Locality data shows that both before and after the highway’s completion, most specimens were still being collected close to the main and branch roadways or along easily accessible watercourses.

MATERIALS AND METHODS

Description of the Study Area

The study area (Fig. 1) is centered on the town of Mulegé and its adjacent valley, but also includes San Bruno to the north, Punta Chivato to the northeast, and a portion of Bahía Concepción to the south. Locally, the town is referred to as *Heróica* or *H. Mulegé* in order to distinguish it from the municipality of the same name in which it is situated and that straddles the peninsula between the Gulf and the Pacific Ocean from 26.5667° N latitude to the 28th Parallel (Berkeley Natural History Museums n.d.). In the context of this article, Mulegé is used to refer to the entire study area in general, while H. Mulegé refers specifically to the town within it. The study area is bounded east to west for most of its length between the coastline and the Transpeninsular Highway (Hwy 1). While the highway provided a convenient boundary line on the west, a 2000 meter buffer zone to the west of the road was added in order to include the many vouchers that had previously been collected by both the author and others on the west side of the highway in terrain consistent with the adjacent east side. The width of the study area is irregular, measuring from 20 m or less in some places along Bahía Concepción (where there are steep, almost vertical, inaccessible cliffs adjacent to the highway and no buffer zone), to a

maximum of 19.5 km from the coastline to the Sierra de Guadalupe foothills at the western edge of the Mulegé Valley, and about 15.5 km between the foothills and the sea cliffs of Punta Chivato (D. Valov, unpublished data). Utilizing the latitude/longitude tool and the polygon tool at a zoom of 2 km/in on the online mapping tool BerkeleyMapper 2.0 (Berkley Natural History Museum, Berkeley, CA) overlay, the study area was determined to: (1) extend approximately 73 km north to south from San Bruno—its northwestern limit, located at 27° 09' 43.37" N, 112° 10' 20.48" W—to Playa Armenta in Bahía Concepción—its southeastern limit at 26°37'30.52"N, 111°48'37.42"W; and (2) to encompass approximately 397 km² (98,101 acres). Elevations within the area range from slightly below sea level to about 160 m, with most elevations below 100 m (Crumpton 2009). See Appendix 1 for GPS coordinates associated with the locations mentioned throughout this checklist.

Voucher Collections

Between October 2003 and April 2019 over approximately 267 field days, the author made 667 separate collections for a total of 1830 vouchers (including duplicates) representing 366 taxa. An additional seven native species (Appendix 2) and six ornamentals were also observed and photographed by the author during this period but not collected; neither were they among the taxa collected by others. Photos of these 13 species are available on the iNaturalist website and links are referenced in their individual checklist entries. From 2003–2007, most collections were made along Bahía Concepción where the author was based at the time. Beginning in 2007, after the author relocated, the focus for collections shifted and most vouchers were collected around the town of H. Mulegé, as well as northward towards San Bruno and Punta Chivato. Collections were restricted to the months between October and July in any given collection season, which corresponds to the author's presence in the area.

Many sites were visited repeatedly over time, especially after wet seasons and storm disturbances. Some taxa were collected from multiple sites and habitats as well as across time. In 2010, the author's collection numbering schema was changed from a year+3-digit format to a regular ascending number format. The change was precipitated when it was discovered that a number of databases were either not capturing or were dropping the first four digits (year), leading to incorrect data retrieval due to duplicate specimen numbers.

Geo-referencing data were generated using a Garmin ETrek GPS unit or Google Earth (Google Earth v. 4.3–7.0, Google Earth Pro v. 7.3.2, Google, Inc., Mountain View, CA). Google Earth maps were also used to help locate potential collection areas. Additional phenology and distribution data were

collected on at least another 100 fieldwork days during the study period.

The Baja California Peninsula synoptic collection located at the San Diego Natural History Museum's herbarium (SD) was used for initial determinations and was accessed on-site or via digital images made available on their Flora of Baja California website (San Diego Natural History Museum 2008–2017). The collection's curator, Dr. Jon Rebman, confirmed most of the author's specimens.

The author's voucher specimens were deposited at SD and the Herbario del Centro de Investigaciones Biológicas del Noroeste (HCIB) in La Paz, Baja California Sur (BCS), Mexico. Historical collections from within the study area were located through database searches at SD and HCIB as well as the following on-line databases from 2009–2018: The Baja California Botanical Consortium database, which currently includes specimen data from 13 herbaria in the United States and Mexico (San Diego Natural History Museum 2008–2017); the SEINet Portal Network (2009+); and the Consortium of California Herbaria (2013). Search parameters included locality names and/or geographical (latitudinal and longitudinal) boundaries. From these searches, tables were compiled and cross-referenced to eliminate duplicate collections, errors in determinations, and nomenclatural changes. For verification, digital images were obtained either online or from requests made to the corresponding herbaria. A list of excluded taxa from the data searches can be found in Appendix 3.

The complete voucher-based checklist is presented here. It is arranged according to Rebman et al. (2016) which follows the Angiosperm Phylogeny Group III classification system as well as the Jepson Manual (Baldwin et al. 2012) for major groups and families, but with some exceptions for placement of basal dicots and a few plant families. The Mulegé checklist also incorporates new work on the familial classification of the Boraginales (Luebert et al. 2016). The checklist includes additional species-specific annotations, based on data from voucher collections and the author's vegetation surveys, phenology inventories, longitudinal photo series, and field observations over 15 field seasons around Mulegé (Valov 2019a, b, c, d). However, they should not be construed as definitive or exclusive either within or outside the area, given the sizeable area not investigated. Some areas that warrant further investigation, especially after the summer rainy season, include the many small, more difficult to access canyons and arroyos along the western escarpment of Bahía Concepción; the dunes extending between San Bruno and Punta Chivato, and between the south end of Punta Chivato and Playa Santa Inés; the estuaries at Playa Santa Barbara and Punta Chivato; the upper slopes of the hills forming the Mulegé Valley basin; and the Sierra Azteca. Current nomenclature and synonyms are from Rebman et al. (2016) and Leubert et al. (2016). Common names in Spanish are from: León de

TABLE 2. COMPOSITION OF THE MULEGÉ REGION BY MAJOR TAXONOMIC GROUPS.

	Families	Genera	Species	Infraspecies
Pteridophytes	1	1	0	1
Gymnosperms	1	1	1	0
Basal Dicots	2	2	2	0
Eudicots	72	249	289	68
Monocots	6	34	38	12
Total	82	288	330	81

la Luz and Coria-Benet (1992); León de la Luz et al. (2014); Rebman et al. (2016); the SEINet Portal Network (2009+); and personal communications with local residents. Common names in English are from: Rebman et al. (2016); Rebman and Roberts (2012); Baldwin et al. (2012); the Jepson eFlora (Jepson Flora Project 2016); and the Plants Database (USDA, NRCS 2016). Information on hydrophytes came in part from León de la Luz and Domínguez Cadena (2006). Listings for the IUCN Red List are from Barstow (2018), IUCN Standards and Petition Subcommittee (2017), and Wegier et al. (2018). NOM listings for threatened or endangered species are from the Secretaría de Gobernación (2019).

RESULTS AND DISCUSSION

Floristic Diversity

The inventory of plants of the Mulegé region currently consists of 411 taxa (330 species, 81 infraspecies) in 82 families and 288 genera (Table 2). The taxa were comprised of 357 eudicots (87%) and 50 monocots (12%), while basal dicots were represented by just two taxa, and gymnosperms and pteridophytes by only one taxon each. Ninety-six percent of the flora is found within just 51 of the families. Fifty three percent of all genera and 58% of all taxa are found in just 10 families (Table 3). Fifty percent of all families have only one genus, while 38% of all families are represented by a single taxon. Eighty-three percent of the local Mulegé taxa are native to the Baja California Peninsula, the Sonoran Desert, or western North America (Table 4).

Herbaceous and shrubby species. Herbs, both annual and perennial taxa, are the most prevalent life forms, and in almost equal numbers comprise 62% of the area’s floristic diversity (Table 4). Shrubs and subshrubs make up a further 26% of the flora. Annuals have the highest number of non-native taxa, while cacti and subshrubs have the lowest. The author was almost never present in Mulegé between July and September so future collections made during these months could result in additional taxa for the study area, especially summer annuals dormant in the local seed bank, and/or species with perennial roots or woody stems that only sprout ephemeraly after late summer rains.

TABLE 3. TEN MOST REPRESENTED FAMILIES IN THE MULEGÉ REGION.

Family	Number of genera	Number of taxa
Asteraceae	36	50
Fabaceae	31	41
Poaceae	26	36
Euphorbiaceae	9	26
Malvaceae	11	18
Cactaceae	11	18
Brassicaceae	8	10
Solanaceae	6	14
Chenopodiaceae	8	13
Convolvulaceae	6	11
Total (10 families)	152	237
All others (72 families)	136	174

Trees. Tree diversity is quite low, with native taxa accounting for just 5% of the flora, and introduced fruit or ornamental trees another 3% (Table 4). It is important to note that ornamental trees included in this inventory do not represent all of the exotic trees in the study area, but rather those that have previously been described by Wiggins (1980) and/or included in the annotated checklist of Baja California plants by Rebman et al. (2016). Only three of the 13 have been seen to naturalize in the area, most commonly escaping gardens into adjacent, often disturbed areas or within the oasis area. These escapes are: *Leucaena leucocephala* (Lam.) deWit subsp. *leucocephala* (Fabaceae), *Pithecellobium dulce* (Roxb.) Benth. (Fabaceae), and *Tamarix aphylla* (L.) H.Karst. (Tamaricaceae).

Fourteen of the 20 native trees are microphyllous and drought-deciduous. Within this subset, there is a further subset of four that are sarcocaulous, and a subset of six that have photosynthetic stems and trunks. Six trees are evergreen, two of which are desert species with thick, leathery or waxy leaves, and two are mangroves with thick, salt-secreting leaves.

All of the 13 non-native trees are from arid, subtropical or tropical origins and by contrast with the native trees, nine are evergreen. Three of the evergreen and three of the deciduous trees are also microphyllous.

Succulents. Stem succulents in the Cactaceae comprise only 4% of the overall species diversity (Table 4). Forms vary and include: relatively small, single and multi-stemmed pincushion cacti in the genera *Mammillaria* and *Cochemiea*; the colonial, multi-stemmed hedgehog cactus *Echinocereus brandegeei* (Coulter) K.Schum.; sticklike clambering cacti in *Peniocereus*; larger, usually single-stemmed barrel cacti in the genus *Ferocactus*; medium sized, multi-stemmed shrubs in *Cylindropuntia* and *Stenocereus*; and the gigantic, tree-like *Pachycereus pringlei* (S.Watson) Britton & Rose.

While the number of cactus species is low, there are at least 46 other species of semi-succulent and succulent herbs, shrubs and trees from at least six

TABLE 4. TAXONOMIC COMPOSITION BY LIFE FORM AND ENDEMISM. Key: An = annual herbs, Ph = perennial herbs, Subsh = subshrub/suffrutescent, Sh = shrubs, Tr = trees, and Sc = stem succulents (most small to large shrubs). The Native count includes Endemic and Near-endemic categories. Near endemics are defined here as those taxa that are native to the Baja California peninsula, but have one to a few known populations just outside the region’s boundaries (Rebman et al. 2016); in the case of the near endemics in this study, all occur in the corresponding Central Gulf Coast Ecoregion of Sonora.

	Totals	Native	Endemic	Near endemic	Introduced
An	129	94	15	1	35
Ph	124	108	14	7	16
Subsh	9	9	1	0	0
Sh	98	93	16	9	5
Sc	18	18	9	1	0
Tr	33	20	4	1	13
Totals	411	342	59	19	69

different families that are well adapted to the arid conditions of the region. Leaf and/or stem succulents are found in Aizoaceae (2 spp.), and Portulacaceae (3 spp.). Succulent-like plants with a milky sap and/or a waxy cuticle are found within Apocynaceae (5 native spp.) and Euphorbiaceae (12 spp.) (Fig. 3A). Shrubs and trees with pachycaulous stems or trunks belong to Anacardiaceae (1 sp.), Burseraceae (3 spp.), and Euphorbiaceae (2 spp.). Succulent halophytes are also present from Aizoaceae (2 spp.), Chenopodiaceae (6 spp.), Bataceae (1 sp.), and Heliotropiaceae (1 sp.).

Parasites. Holoparasites comprise just 1% of the flora (Table 5). They include the annual dodders (*Cuscuta* spp.) and two perennial mistletoes, *Phoradendron californicum* Nutt. (Viscaceae) and *Psittacanthus sonorae* (S.Watson) Kuijt (Loranthaceae), all of which are restricted to a small variety of local host species. The dodders occur mainly on herbs in the genera *Boerhavia*, *Amaranthus*, and *Euphorbia*. *Phoradendron* is found on leguminous trees (*Olneya tesota* A.Gray, *Parkinsonia* spp., and *Prosopis* spp.). *Psittacanthus* is restricted to elephant trees (*Bursera* spp.) in this area. There are also two hemiparasitic species in Krameriaceae, *Krameria erecta* Schult. and *K. paucifolia* (Rose) Rose.

Vines. Seven percent of the flora is composed of annual, perennial, and woody vine species (Table 5). They are represented most notably by species in Apocynaceae (4 spp.), Convolvulaceae (9 spp.), and Curcubitaceae (6 spp.) (Table 5). Twenty percent of the vines are non-native, four of which are garden escapes into the oasis area and one into a coastal dune.

Hydrophytes. A total of 72 hydrophytic plants in 30 families were identified in the study area (18% of the flora; Table 5). Sixty-eight taxa within the study area (94.4% of all hydrophytes) were found to occur only within the Mulegé oasis. These were all taxa known to occur elsewhere on the peninsula in a variety of habitats, such as wetlands and riparian areas in the mountains, as well as dry habitats at higher altitudes with slightly cooler temperatures and higher precipitation, as is the case for the Sierra de

Guadalupe watershed to the west of the study area. Given that they were restricted to the oasis, except in the case of ornamentals, it might well be inferred that they should be considered obligate hydrophytes within this study area.

Common oasis hydrophytes included: grassy, reedy plants in Arecaceae (2 spp.), Cyperaceae (8 spp.), Poaceae (4 spp.), and Typhaceae (1 sp.); annual and perennial herbs in Asteraceae (10 spp.), Gratioliaceae (2 spp.), Phymaceae (3 spp.), Saururaceae (1 sp.), and Solanaceae (4 spp.), as well as several shrubs and small trees in Apocynaceae (2 spp.), Convolvulaceae (2 spp.) and Tamaricaceae (2 spp.).

The non-native date palm *Phoenix dactylifera* L. (Arecaceae) and the native fan palm *Washingtonia robusta* H.Wendl. (Arecaceae) are the most noticeable hydrophytes in the oasis.

The giant reeds, *Arundo donax* L. (Poaceae) and *Phragmites australis* (Cav.) Steud. subsp. *berlandieri* (E.Fourn.) Saltonstall & Hauber (Poaceae), are also quite noticeable, forming large stands along the banks of the river and uppermost part of the estuary. Their populations and distribution have varied with the intermittent cycles of destruction from flash floods and their recolonization during non-flood years.

Just one floating hydrophyte, *Ceratophyllum demersum* L. (Ceratophyllaceae), has been recorded historically in the Mulegé River, having been collected in 1921 by I. M. Johnston. It was not found during the study period, likely due to the high-volume, high-velocity flooding that has occurred on a regular basis during this time period (Pérez-Navarro and León de la Luz, Centro de Investigaciones Biológicas del Noroeste, personal communication; J. P. Rebman, San Diego Natural History Museum [SDNHM], personal communication).

Only four hydrophytic species have been collected outside of the current Mulegé oasis area: *Cyclospermum leptophyllum* (Pers.) Sprague ex Britton & P.Wilson (Apiaceae) by Wiggins in 1963 from an irrigation ditch in an orchard area east of the Mission that no longer exists; *Eustoma exaltatum* (L.) Salisb. ex G.Don subsp. *exaltatum* (Gentianaceae) from the lower Arroyo San José de Magdalena; *Juncus acutus*

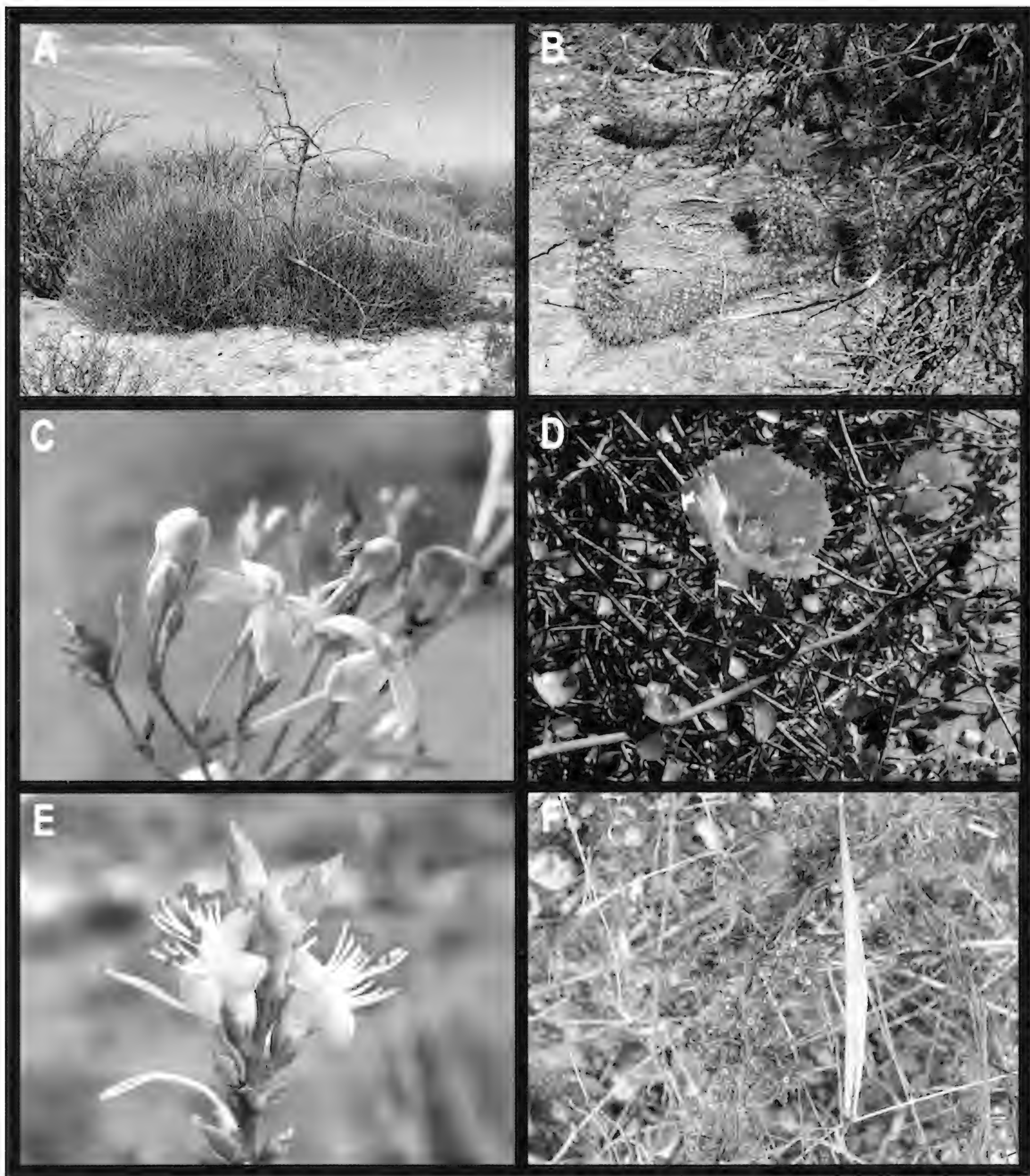


FIG. 3. A few sample photos of the study area's flora. A. *Euphorbia ceroderma*, a stem-succulent shrub (large low group at center), is found in the study area only in gypsiferous deposits at Punta Chivato. B. Creeping stems topped with hummingbird-pollinated flowers of *Cochemia poselgeri*, here blooming profusely in December. C. *Stenotis brevipes* is a small to medium cespitose shrub; the corolla limb 10-12 mm diam. D. *Gossypium armourianuam* is a shrub 1-1.5 m H, fl 4-5 cm diam. E. *Fouquieria burragei* inflorescence. F. The gray-green, entwining stems of *Pattalias palmeri* are thready; fl \leq 1 cm W.

L. subsp. *leopoldii* (Parl.) Snog. (Juncaceae) from salt pans along the Mulegé estero; and *Ruppia maritima* L. (Ruppiaceae), the only marine subtidal vascular species collected, found in small patches along a number of beaches in Bahía Concepción.

Regional Floristic Comparisons

To better understand the Mulegé flora in relationship to that of adjacent desert and coastal regions of the Baja California Peninsula, plant inventories from four different floristic studies were compared with the

TABLE 5. TAXONOMIC COMPOSITION OF HYDROPHYTES, PARASITES AND VINES. The Native count includes Endemic and Near-endemic categories. Near endemics are defined here as those taxa that are native to the Baja California peninsula, but have one to a few known populations just outside the region’s boundaries (Rebman et al. 2016); in the case of the near endemics in this study, all occur in the corresponding Central Gulf Coast Ecoregion of Sonora.

	Totals	Native	Endemic	Near endemic	Introduced
Hydrophytes	72	56	2	0	14
Parasites	6	6	0	0	0
Vines	30	24	3	0	6

Mulegé checklist. These studies included the San Felipe Desert (Delgadillo-Rodríguez and Macías-Rodríguez 2002), the Central Gulf Coast ecoregion mainly between Loreto and the East Cape (Perez-Navarro et al. 1999), the Gulf of California Islands (Rebman et al. 2002), and the Sierra de la Giganta (León de la Luz et al. 2008). Table 6 shows the percentage of families, genera and taxa that Mulegé shares with these four floristic studies. Mulegé has the least affinity with the San Felipe Desert at all levels, but especially at the genus and the species level, and the greatest affinity across all categories with the flora from both the Sierra de la Giganta and Gulf Islands, followed closely by that of the BCS coast. This latter floristic study focused primarily on the coastal areas of the municipalities of Los Cabos, La Paz, Loreto and Comondú. Comparisons such as these help illustrate the diversity of the Central Gulf Coast ecoregion, highlight the localized compositional differences that are found across the peninsula—most noticeably in desert scrub taxa at the species level—and support the need for inclusion of a broad variety of habitats and plant communities when developing conservation plans.

Endemism

The total percentage of endemic (and near-endemic) taxa in the study area is 19% (Table 4). In comparison, the proportion of endemics for the entire peninsula is 25.9% (Rebman et al. 2016). By far, the majority of these taxa are widespread peninsular endemics, like the annual herb *Drymaria holosteoides* Benth. var. *holosteoides* (Caryophyllaceae), though some have a more restricted range. Not surprisingly, Cactaceae has the highest degree of endemism (67%) for this study area, while the

percentage of endemism for the entire peninsula is 74.6% (Rebman et al. 2016).

Four genera found in the study area are peninsular endemics (Rebman et al. 2016): *Amauria* and *Coulterella* (Asteraceae); *Cochemiea* (Cactaceae) (Fig. 3B); and *Stenotis* (Rubiaceae, Fig. 3C). Near-endemic genera include: *Bajacalia* (Asteraceae) and *Viscainoa* (Zygophyllaceae), both of which are also found in Sonora.

Local endemics. Bahía Concepción copperleaf (*Acalypha saxicola* Wiggins, Euphorbiaceae), a small shrub common on rocky hillsides along Bahía Concepción (Rebman and Roberts 2012), is one of just three locally endemic species. Another notable endemic is *Gossypium armourianum* Kearney (Malvaceae) (Fig. 3D), a shrub with a very small range reaching just beyond the study area. The very rare *Salvia malvifolia* Epling & Játiva is known only from two nearby collections in the hills west of Playa Los Cocos and Playa El Burro, above Rancho El Coyote, on Bahía Concepción. More field work is needed to determine if this is a micro-endemic species to this particular canyon, or if it actually has a wider distribution at similar elevations within other canyons in the mountain ranges around Mulegé and Bahía Concepción.

Geographically restricted endemics. The endemic white-flowered desert lavender *Condea anitae* (Epling & Játiva) Harley & J.F.B.Pastore (Lamiaceae) is mostly known from the Sierra de la Giganta, but along Bahía Concepción it can be found occasionally side by side with *Acalypha saxicola* on rocky hillsides.

At least six BCS endemics with restricted geographical distributions have their known northern limits in, or around, the Santa Rosalía or Mulegé area: the small, spiny tree *Fouquieria burragei* Rose (Fouquieriaceae) (Fig. 3E); *Pattalias palmeri* S.Watson var. *palmeri* (Apocynaceae), a thready milkweed vine with tiny greenish-yellow flowers (Fig. 3F); *Aeschynomene nivea* Brandegee (Fabaceae), a virgate shrub mainly found in washes or on rocky hillsides; *Coulterella capitata* Vasey & Rose (Asteraceae) of coastal rocky cliffs and beaches; the scandent, perennial vine *Jacquemontia eastwoodiana* I.M.Johnst. (Convolvulaceae); and the delicate and diminutive annual *Drymaria debilis* Brandegee (Caryophyllaceae).

Baja California near endemics. There are a small number of near endemics, classified as such because

TABLE 6. PERCENTAGE OF MULEGÉ FLORA SHARED WITH OTHER BAJA CALIFORNIA PENINSULA REGIONAL STUDIES, ARRANGED FROM NORTH TO SOUTH. ¹ Delgadillo-Rodríguez and Macías-Rodríguez (2002). ² León de la Luz et al. (2008). ³ Rebman et al. (2002). ⁴ Pérez-Navarro and León de la Luz (1997).

Flora/Study	Families	Genera	Taxa
San Felipe Desert ¹	56	16	23
La Sierra de la Giganta ²	74	66	63
Gulf of California Islands ³	62	58	62
BCS Coast ⁴	66	55	40

they are also found in one, or just a few, restricted localities beyond the peninsula (where they are more widespread and quite common). With the exception of *Bursera epinnata* (Rose) Engler (Burseraceae), which ranges from around Santa Rosalía to the Cape, and which is also found on Isla Socorro located about 470 km to the south of the Cape in the Pacific Ocean, the rest of the near-endemic species are also found across the Gulf of California in the state of Sonora within a limited area of its corresponding Central Gulf Coast region. These include: *Pachycereus pringlei* (S.Watson) Britton & Rose and *Stenocereus gummosus* (Engelm.) A.C.Gibson & K.E.Horak; *Hoffmannseggia intricata* Brandegee (Fabaceae), and *Lysiloma candidum* Brandegee; the cliff-clinging wild fig *Ficus petiolaris* Kunth (Moraceae); and *Viscainoa geniculata* (Kellogg) Greene var. *geniculata* (Zygophyllaceae).

Noteworthy Collections

Fouquieria burragei. According to Rebman and Roberts (2012), this tree is known to occur on rocky hillsides from around Mulegé, most notably along Bahía Concepción and southward from there almost to La Paz, as well as on some Gulf islands.

Prior to the study period, the northernmost-known specimen was from about 21 km south of H. Mulegé (Gallagher 254, “13.4 mi S of Mulegé along MEX Hwy 1”, Oct 1981), placing it somewhere between Punta Arena and Playa Coyote. Two of the author’s collections have incrementally shifted the northern recorded range of the species to outside the confines of Bahía Concepción. The author’s first collection from Colonia Loma Azul in H. Mulegé (Valov 2004157) was approximately 21 km northward of the Gallagher specimen. Valov 2009074 moved the known range an additional 9 km northward, along the northwestern side of the Sierra Azteca.

Gossypium armourianum. At the time that Wiggins published his flora of the peninsula (Wiggins 1980), this species was thought to be restricted to Isla San Marcos (located just offshore due east of San Bruno and north of Punta Chivato). In 2009, the first vouchers of the species were collected as part of this current study, not on the island, but on the peninsula at Punta Chivato, thereby extending the species’ documented range approximately 20 km to the southwest. Rebman et al. (2016) revised the range, extending it from north of Santa Rosalía to the vicinity of Mulegé, including Isla San Marcos. They added that while there were other reported occurrences farther north in Baja California near Bahía San Francisquito, they were unable to find specimens for that state. In addition, J. P. Rebman (SDNHM, personal communication) mentioned that there was a putative collection made from the mainland just north of Santa Rosalía, but that he had been unable to locate the collector or specimen. Finally, while

Wegier et al. (2018) state that *G. armourianum* occurs on Isla San Marcos and Isla del Carmen (offshore near Loreto, BCS), they cite no associated specimens in that work, especially none that confirm its occurrence on the latter island.

Threatened and Protected Species

Within the study area, there are six species that are specifically included under NOM-059-SEMARNAT-2010, Mexico’s Federal Environmental Law (Secretaría de Gobernación 2019). This law, first passed in 2001 and updated in 2010 and 2019, identifies *at risk* species of wild flora and fauna, and establishes criteria for their inclusion, exclusion or change in status on the list. Categories are *Extinct*, *Endangered*, *Threatened*, and *Subject to Special Protection*.

Threatened species are those that can become endangered in the short or long term if factors that negatively impact their survival continue to be present and lead to the modification or loss of habitat or directly decrease their populations. One species, San Marcos cotton (*Gossypium armourianum*) is listed as *Endangered*; four species in the study area are listed as *Threatened*: the three mangrove species *Laguncularia racemosa* (L.) Gaertn. (Combretaceae), *Rhizophora mangle* L. (Rhizophoraceae), and *Avicennia germinans* (L.) L. (Acanthaceae); and the Long-spined Barrel Cactus, *Ferocactus rectispinus* (Engelm.) Britton & Rose (Cactaceae). A sixth species, Desert Ironwood (*Olneya tesota*) is listed as *Subject to Special Protection*. These are species that could become threatened by factors that negatively impact their viability and therefore it has been determined that their recovery and conservation, or that of associated species, needs to be facilitated. It is also listed in the IUCN Red List as *Near Threatened A2d* because of declining populations in the wild due to residential and commercial development, as well as resource use (e.g., consumption as fuel, building materials) (Barstow 2018). Locally, ironwood is used to a small degree both for wood carving and firewood, but the razing of desert scrub for development should be seen as the greater threat to the species in the Mulegé area (D. Valov, personal observation).

Gossypium armourianum is also included on the IUCN Red List as *Critically Endangered* (possibly extinct in the wild) —*CR, C2a(i)* (Wegier et al. 2018). This rating appears to be based on the premise that: the species only occurs on Isla San Marcos and Isla del Carmen (see previous discussion under Endemism); that individual plants had not been located on their field visits to the original locations or other likely habitats on either island between 2007 and 2017; and that its small, fragmented population (fewer than 250 total individuals) were potentially threatened by introduced species as well as commercial and recreational development. Given that the author has observed and documented numerous plants during this study period along at least several

kilometers of roads and trails in the Punta Chivato area (especially on gypsum-rich soils), the species is clearly present in the wild with what seems to be a sizeable, perhaps healthy population. However, given that the species' current range and population size in the area had not been determined, it needs to be carefully assessed, and its IUCN listing reevaluated in light of any new data. The conclusion presented by Wegier et al. (2018) most relevant to the Punta Chivato population is that the species will likely face the same potential conservation threats posed by the ongoing land development in the area, especially if no local conservation strategy is developed.

All species in this inventory within Cactaceae, as well as the succulent species within the genus *Euphorbia* are included in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (CITES 2016a). This document "lists species that are not necessarily now threatened with extinction, but that may become so unless trade is closely controlled. It also includes so-called 'look-alike species', i.e., species whose specimens in trade look like those of species listed for conservation reasons" (CITES 2016b). While taxa within Cactaceae are individually listed in the CITES appendix, specific taxa in *Euphorbia* are not. Presumably, the species listed in the Mulegé flora that would be affected would include *Euphorbia ceroderma* I.M.Johnst., *E. lomelii* V.W.Steinm., and *E. xanti* Englm. ex. Millsp.

Local Extirpations

The bottomlands along the Mulegé estuary have undergone a great deal of change since the arrival of tourists and their recreational vehicles beginning in 1973 when the transpeninsular highway was completed (E. Zúñiga Rosas, H. Mulegé native, personal communication). Historically, locals have mostly built their houses on the slopes above the river, while the foreign newcomers began to expand into the bottomlands and riverfront. Much of the low areas upstream were fruit and palm orchards; while downstream closer to the gulf, salt pans dominated the landscape. *Juncus acutus* L. subsp. *leopoldii* (Parl.) Snog. (Juncaceae) has yet to be completely extirpated from the remaining salt pans and orchard margins in the area. Just a small number of plants have been found in empty lots at two different sites, one near the Hotel Serenidad airstrip in the El Cacheno neighborhood and the other less than a kilometer upriver from the first. Its current status is unclear across the area, as it may also be present in some of the area's more isolated salt marshes and dunes, for example along Bahía de Santa Inés to the south at Boca el Mojón and Estero San Marcos along the northern coast, two areas that were inaccessible during this study.

Mangrove trees on both banks of the estuary were gradually cleared to make roads and create openings through the dense vegetation for river views and boat

access along the estuary. Currently many more mangrove trees have been lost to cutting and subsequent storm damage than remain. Historical photos by the author taken between 2005 and 2018 show the dramatic changes across the study area, including the estuary banks (Valov 2019a). Conservation and restoration of the mangrove thickets along the river should be a top priority; a GIS analysis of historical and current populations would be a valuable first step. Part of any conservation plan should involve environmental education about the importance of the mangroves on both the coastal ecosystem and fisheries (currently in decline), and be targeted especially at the local fishers and tourism service providers, in order to assure participation by local stakeholders.

Coulterella capitellata, an endemic perennial herb collected by K. Anderson in January 1994 near the mangroves south of Playa El Coyote, was not located by the author during this study. Its absence may be due to chance or the human induced loss of habitat in the nearby vicinity.

Of the other 17 native taxa and one ornamental previously collected by others, but not observed or located by the author over the course of this study (see Appendix 2), a few are summer annuals or perennials and would not necessarily be expected to have been seen during the regular winter and spring collection seasons. Several others that were collected in the Mulegé River valley may have been permanently lost during the multiple floods since 2001 or due to heavy foraging. Finally, the size of the study area with its high number of possible collection sites, in combination with variations in climatic conditions and rain-drought cycles, likely played a role and added to the stochastic appearance of species across the area.

Introduced, Naturalized and Invasive Plants

Seventeen percent of the inventory's taxa are introduced, including 20 ornamental species (14 trees, five shrubs, and one annual) found commonly in towns and ranches across the area and of which most were described in Wiggins (1980). Thirty-five introduced species (including six ornamentals) appear to have naturalized in small numbers along some dry desert watercourses, within the oasis, and/or in other disturbed areas, usually where water is intermittently available. Only six of these species are, or have the potential to be, highly invasive in the region and to pose threats to the native flora and fauna. These are: *Cenchrus ciliare* L. (Poaceae), *Brassica tournefortii* Gouan, (Brassicaceae), *Cynodon dactylon* (L.) Pers. var. *dactylon* (Poaceae), *Panicum antidotale* Retz. (Poaceae), *Arundo donax*; and *Cryptostegia grandiflora* (Roxb.) R.Br. (Apocynaceae).

Cenchrus ciliare (buffelgrass) is the most noticeable noxious weed, not only in the Mulegé region, but along the entire length of the peninsula. It is

native to Africa and India, and in the 1930s was introduced in the southwest U.S. as livestock forage (Wipff 2003). It soon spread throughout the arid lands of the Mexican northwest where it too had been introduced for forage. It has become the scourge of the Sonoran Desert because it thrives in both moist and dry regimes, can flower almost any month of the year at low elevations, chokes out native species, and creates fuel for fires (National Park Service 2010). The author has noted a dramatic increase in the spread of buffelgrass into both desert and dune scrub well removed from the main highway, as well as upslope areas adjacent to the highway and roads. Basically, any road or track provides a path for the further spread of the grass. The invasion does not seem to be viewed by local government or ranchers as a threat and no actions appear to be underway to curb its spread. On the contrary, as of 2017, the government still provided ranchers with the seed for sowing forage (A. Osuna, son of local rancher, personal communication). Roadside plants are seasonally cut back to provide better visibility, but this actually seems to lead to further spread of the species (D. Valov, personal observation).

Brassica tournefortii (Saharan mustard) seems to be following the same trajectory as buffelgrass. It is most noticeable in agricultural areas and is spreading outwards from those areas up and down the peninsula. In the past few years, the author has observed it growing beyond cultivated fields and in disturbed soils within the Mulegé palm oasis where it produces quickly in the fall and winter following wet summers.

Cynodon dactylon var. *dactylon* (Bermuda Grass) is widespread in many of the same habitats as buffelgrass, mainly in loose sandy or silty soils, but it does not seem to spread as rapidly or aggressively as buffelgrass (D. Valov, personal observation). It has less biomass than buffelgrass, but may cover large, contiguous areas, and in some cases, may actually help to stabilize open areas of fine loose soils. *Panicum antidotale* (giant panicgrass), another perennial bunch grass, also appears to be naturalizing across the study area along or adjacent to watercourses and has slowly begun to invade downstream areas where it may begin to become more established and crowd out native riparian species (D. Valov, personal observation).

Another problematic species is *Arundo donax* (giant reed), which is invasive along the Mulegé River. It grows alongside *Phragmites australis* subsp. *berlandieri* (gulf coast reed) in places along the river. The species' fast vegetative growth via sturdy rhizomes has led to a cyclical decrease in both the width and current of the Mulegé River because it causes a buildup of dense vegetation above and below the dam (D. Valov, personal observation). However, in the past 15 years, repeated floods have cleared out some of the blockages, at least temporarily. This species is considered undesirable by some

botanists and ecologists, but others see it as important to the peninsula's oasis communities, providing building material for human use and habitat for wildlife (Pérez-Navarro, HCIB, personal communication).

Cryptostegia grandiflora is an introduced vine that has become invasive in many oases and riparian areas across the southern peninsula. Fortunately, in the Mulegé palm oasis, it has not yet shown itself to be a problem. Just a few plants have been seen far from the river's edge. However, in the summer of 2018, town officials began to decrease the volume of water allowed to spill over the dam, causing the river and the water table upstream to rise substantially. This has caused some areas to become saturated or even inundated farther within the oasis, where *Cryptostegia* had been observed. This situation may lead to the species being better able to survive and spread.

Although they are native species, *Amaranthus watsonii* Standl. and *Cenchrus palmeri* Vasey can easily be considered invasive weeds. Both do exceptionally well and appear to be spreading in disturbed soils, along roadsides, and in almost any habitat where livestock are free to range (D. Valov, personal observation). *Amaranthus watsonii* can be seen densely covering acres of fallow agricultural fields by the end of the summer-wet season and then persisting far into the following March or April.

CONCLUSION

The geomorphic variation of the Mulegé area allows for a heterogenous habitat complex which supports a diverse, species-rich flora. Prior to this study, collections made between 1887 and 2012 resulted in 139 species and 184 total taxa from within the study area. Eighteen of these taxa were not seen or collected during the study period (Appendix 2). With this checklist, the documented flora of the Mulegé area has increased by 190 species (137%) and 227 total taxa (123%, 164 native taxa and 63 non-native taxa). Currently there are at least 411 known taxa, of which 262 are native to the peninsula, 69 are endemic or near endemic to the peninsula, three are local endemics, six are geographically restricted endemics, and 69 are introduced. The area is impacted by population growth, as well as an increasing number of human activities, including agriculture, livestock grazing, fishing, off-roading, real estate development, and tourism. Climatic events have influenced and shaped the natural features of the area, augmenting the anthropogenic changes. The accelerated loss of mangroves along the estuary in just the last 15 years is a dramatic example of these combined factors. The floristic diversity of the Mulegé area is in need of further study to ascertain the impacts of these activities on the flora and to establish conservation priorities.

CHECKLIST OF THE VASCULAR PLANTS OF MULEGÉ, BAJA CALIFORNIA SUR, MEXICO

Notes and Keys to Abbreviations and Conservation Listings

Nomenclature, endemism and distribution are based primarily on Rebman et al. (2016) and Luebert et al. (2016). Synonymy is indicated in brackets [] and included only for entries as they appear in Wiggins (1980) or Rebman et al. (2016). Collector and collection number appears in italics followed by the herbarium accession number in parentheses. A number of the author's specimens are still pending accession numbers and the herbarium is listed in parentheses without a number. Where there is no collection number, the location and year is given along with the herbarium abbreviation and accession number. Common names in Spanish are from: León de la Luz and Coria-Benet (1992); León de la Luz et al. (2014); Rebman et al. (2016); the SEINet Portal Network (2009+); and personal communications with local residents. Where there are common Spanish names, they are listed first and separated from the English with a semicolon. English common names are from: Rebman et al. (2016); Rebman and Roberts (2012); Baldwin et al. (2012); Jepson Flora Project (2016); and the Plants Database (USDA, NRCS 2016).

Herbarium Key. ARIZ = University of Arizona; ASU = Arizona State University; BCMEX = University Autónoma de Baja California, Ensenada, Mexico; DS = Dudley Herbarium (at California Academy of Sciences); DES = Desert Botanical Garden; HCIB = Herbarium at CIBNOR, La Paz, Mexico; NY = New York Botanical Garden; SBBG = Santa Barbara Botanic Garden; SD = San Diego Natural History Museum; UTC = Intermountain Herbarium, Utah State University.

Symbol and Abbreviation Key. * = introduced, invasive, and/or weedy plants (often of disturbed soils at roadsides, or around farms or habitation). All other plants without this symbol are considered to be native; § = taxon not collected, but reported in literature or direct observation by the author; LC = Lower California (peninsula); Pers. obs. = personal observation (no specimen, but author photos on iNaturalist as noted below); SON = Sonora; SIN = Sinaloa.

Life forms. **An** = annual herb; **Hf** = hydrophyte/hydrophyllic; **Pa** = parasite; **Ph** = perennial herb; **Sc** = succulent; **Sh** = shrub; **Subsh** = subshrub/suffrutescent; **Tr** = tree; **Vi** = vine.

Plant Communities/Geomorphic Formations: The following key is used to describe the plant community and/or geomorphic formation in which a taxon has been, and most likely can be, found *within the study area*. Sample images of these classifications within the study area can be found in Fig. 2, as well

as on the author's *Mulegé Flora Project* web page (Valov 2019a). Entries with qualifiers (e.g., SCB-AF) reflect either that a taxon is restricted to, or has only ever been observed in, that (those) geomorphic formation(s). Where there is no qualifier after a community (e.g., SCB or D) a generalized distribution across all of the community is inferred. The order of entries for each taxon is from most to least common.

CW = coastal wetland (estuary, salt or mud flats); D = beach dunes; D-R = rear dunes; D-F = fore dunes; D-BS = beach backshore; MG = mangroves; RP = riparian (along the Mulegé River and oasis/palm orchards); RUD = ruderal (e.g., disturbed soils of roadsides, around or at edges of habitations and agricultural areas); SCB = sarcocaulous scrub; SCB-AF = scrub of alluvial fans; SCB-AS = scrub of interior alkali sink; SCB-CB = scrub of coastal bluffs; SCB-GYP = scrub with secondary gypsum deposits at Punta Chivato; SCB-RH = scrub of rocky hillsides; SCB-WC = scrub of dry water courses.

Conservation Listings: NOM Listings (from Norma Oficial Mexicana NOM-059-ECOL-2001, Secretaría de Gobernación. 2019). NOM P = peligro de extinción/endangered. NOM A = amenazada/threatened. NOM Pr = protección especial/requiring special protection.

Red List Categories and Criteria (from IUCN Standards and Petitions Subcommittee 2017): CR C2a(i) = *Critically endangered*; and small population size (fewer than 250 individuals) and fragmentation, decline or fluctuations; where even the largest subpopulation is quite small. NT A2d = *Near Threatened*; and population reduction inferred and/or suspected; and where reduction or its causes may not have ceased or may not be understood or may not be reversible.

Species by Family

Families are arranged alphabetically within their appropriate sections.

- I. Leptosporangiate Ferns
- II. Gymnosperms: Gnetales
- III. Angiosperms: Magnoliids-Piperales
- IV. Angiosperms: Ceratophyllales
- V. Angiosperms: Eudicots
- VI. Angiosperms: Monocots

I. Leptosporangiate Ferns

Pteridaceae

Notholaena californica D.C.Eaton subsp. *californica* **Ph.** Not observed during study. SCB-RH: uncommon; under boulders. *Moran 9053* (SD 66790). HELECHO; CALIFORNIA CLOAK FERN.

II. Gymnosperms: Gnetales

Ephedraceae

Ephedra aspera Engelm. S.Watson **Sh.** SCB-GYP:

rare; Punta Chivato. *Valov* 2009007 (SD 192832). CAÑATILLO; MORMON TEA.

III. Angiosperms: Magnoliids-Piperales

Saururaceae

Anemopsis californica (Nutt.) Hook & Arn. **Ph.** **RP:** rare; small persistent population along shady banks of the Mulegé River near the *Ojo*; roots occasionally harvested locally to make herbal remedies. *Valov* 1036 (SD 218382); *Knobloch* 2347 (SD 94292). YERBA MANSA.

IV. Angiosperms: Ceratophyllales

Ceratophyllaceae

Ceratophyllum demersum L. **Ph.** **Hf.** Not observed during the study period in the Mulegé River, possibly due to the numerous high volume, high velocity floods that have occurred during that time. *Johnston* 3688. HORNWORT, COONTAIL.

V. Angiosperms: Eudicots

Acanthaceae

Avicennia germinans (L.) L. **Sh.** **MG,** **CW:** widespread and common across study area in estuaries, lagoons, and shorelines. Listed as NOM A. *Anderson* 1142-A (ASU 0047636); *Dice* 574 (SD 117581); *Dillon* 1954 (UCR 29738); *Howe* 4003 (SDSU 13746); *Valov* 2005088 (HCIB 21443); *Wiggins* 5455 (SD 65549). MANGLE NEGRO; BLACK MANGROVE.

Carlowrightia arizonica A.Gray [In *Wiggins* as *Carlowrightia californica* Brandegees, *Carlowrightia cordifolia* A.Gray] **Sh.** **SCB-RH:** widespread, uncommon. *Daniel* 207 (UC 1530733), 1890 (ASU 0001077); *Valov* personal observation (*Ojo de Agua*, 2013). RAMA TORO; ARIZONA CARLOWRIGHTIA.

Dicliptera resupinata (Vahl) Juss. [In *Wiggins* as *Dicliptera formosa* Brandegees] **Ph.** **Hf.** **RP:** uncommon; known only from the Mulegé oasis in dry channels and ditches. *Valov* 1127 (SD 260879). HUACHICHILA, ALFAFILLA; ARIZONA FOLDWING.

Holographis virgata (Harv. ex Benth. & Hook.f.) T.F.Daniel subsp. *glandulifera* var. *glandulifera* (Leonard & C.V.Mort.) T.F.Daniel [In *Wiggins* as *Berginia virgata* Harv. ex Benth var. *glandulifera* Leonard & C.V.Mort.] **Sh.** **SCB-WC,** **SCB-RH:** widespread, sporadic; LC endemic. *León de la Luz* 3657 (HCIB 13591); *Valov* 2004018 (HCIB 23867), 2004080 (HCIB 23854). RAMA BLANCA; GLANDULAR DEVILBUSH.

Justicia californica (Benth.) D.N.Gibson [In *Wiggins* as *Beloperone californica* Benth.] **Sh.** **D-R,** **D-F,** **SCB-WC:** widespread, sporadic. *Valov* 2006056 (HCIB 22829), 2010035 (SD 208212). CHUPARROSA, RAMA BLANCA, RAMA CENIZA; HUMMINGBIRD BUSH.

Ruellia californica (Rose) I.M.Johnst. subsp. *californica* [In *Wiggins* as *Ruellia californica* (Rose) I.M.Johnst.] **Sh.** **SCB,** **SCB-GYP:** widespread, common and abundant. *Daniel* 204 (ARIZ

23180), 1891 (ASU 001310); *de Groot* 4877 (SD 250190); *Gentry* 23180 (DES 00008240); *Johnston* 3681 (UC 251581); *Moran* 7473 (ARIZ 137545); *Valov* 2003075 (HCIB 20133), 2004055 (HCIB 20154), 2004203 (HCIB 23905); *Wiggins* 11411 (UC 758638). FLOR DE CAMPO, RAMA PARDA, HUATILLA; BAJA CALIFORNIA WILD-PETUNIA.

Ruellia ciliatiflora Hook. [syn = *Ruellia nudiflora* (Engelm. & A.Gray) Urb.] **Ph.** *Valov* 1268 (HCIB). **RP:** appeared in the Mulegé oasis in dry channel after 2015 flood, present still in 2017; rare elsewhere on peninsula and known only from a few specimens from Bahía Concepción and the s Sierra de la Giganta (Rebman et al. 2016). VIOLET WILD-PETUNIA.

Aizoaceae

Mesembryanthemum crystallinum* L. **An. **D-R,** **SCB-AS,** **SCB-WC,** **RUD:** widespread, and at times common and often abundant; considered highly invasive in other regions of the peninsula but within the study area does not seem to be very aggressive or persistent. *Valov* 2005069 (HCIB 21427). HIELITO, VIDRIERO; CRYSTALLINE ICE-PLANT.

Sesuvium portulacastrum L. **Ph.** **D,** **CW,** **MG:** succulent perennial in most wetlands and beaches. *Sanders* 6374 (UCR 42934); *Valov* 2004209 (HCIB 23909). VERDOLAGA DE PLAYA; SHORELINE SEA PURSLANE.

Trianthema portulacastrum L. **An.** **T. F. Daniel** 2386 (ASU 0000040); *Rebman* 3354 (SD 139360); *Valov* 2004149 (HCIB 22209). **SCB,** **D-R,** **RUD:** a widespread and very abundant ground cover, esp. on open or disturbed soils after summer rains. VERDOLAGA DE COCHI, QUELITE; DESERT HORSE PURSLANE.

Amaranthaceae

Amaranthus fimbriatus (Torr.) Benth. ex S.Watson **An.** **SCB,** **RUD:** widespread, common after summer rains. *Valov* 2004187 (HCIB 23891). QUELITE ROJO, BLEDO; FRINGED AMARANTH.

Amaranthus watsonii Standl. **An.** **SCB,** **RUD:** widespread, prolific native species; weed of agricultural fields and watercourses. *Valov* 2003024 (HCIB 20089). QUELITE, QUELITE VERDE, BLEDO; WATSON AMARANTH.

Celosia floribunda A.Gray **Sh.** Not observed during this study; common in southern portion of BCS. *Perrill* 5499 (UCR 68345, Bahía Coyote). **SCB:** BCS endemic. CELOSIA, BLEDO.

Tidestromia eliassoniana (Sánchez. Pino & Flores Olv.) Sánchez. Pino [In *Wiggins* as *T. lanuginosa* (Nutt.) Standl. misappl.] **An.** **D-R:** uncommon in study area with a large population in dunes just S of Mulegé between El Equipalito and El Gallito along Hwy 1; according to Rebman et al. (2016), it is rare in BCS and is mostly known to occur along the coast between Santa Rosalía and Mulegé. *León*

de la Luz 2009-087 (HCIB 24295); *Valov* 2005004 (HCIB 21463). HIERBA LANUDA, ESPANTA VAQUEROS; HONEYSWEET.

Anacardiaceae

§ *Cyrtocarpa edulis* (Brandeggee) Standl. var. *edulis* **Tr.** SCB-WC: Only one tree known prior to 2006; specimen was collected and photographed in 2003 but apparently lost before it could be deposited. In 2006, the tree was swept away in a flash flood; BCS endemic. Valov personal observation (near Huerta Don Chano, Mulegé 2001. <https://www.inaturalist.org/observations/38050366>). CIRUELO CIMARRÓN, CIRUELO SILVESTRE; WILD PLUM.

*§ *Mangifera indica* L. **Tr.** RUD: common garden tree across study area; flowers Feb–Mar with copious fruit (mostly “Manila” variety) harvested around July for food. Valov personal observation (central Mulegé, 2003. <https://www.inaturalist.org/observations/38050678>). MANGO.

Apiaceae (Umbelliferae)

Ammi majus* L. **An. RUD: fairly common garden species at least in H. Mulegé. *Valov* 1312 (SD 265539). ENCAJE; BISHOP’S FLOWER, LARGE BULLWORT.

Arracacia brandegeei J.M.Coult. & Rose var. *brandegeei* **Ph, Hf.** RP: rare, known only from a young vegetative specimen collected in a dry river channel of the Mulegé oasis after the 2013 flood. Plant was gone a few weeks later, possibly due to grazing; this BCS endemic variety is uncommon elsewhere, ranging from the Sierra Guadalupe to the Cape. *Valov* 1214 (SD 265540). CHUCHUPATE.

Cyclospermum leptophyllum* (Pers.) Britton & P. Wilson [In Wiggins as *Apium leptophyllum* (Pers.) F. Mueller ex Benth.] **An, Hf. *Wiggins* 18225 (DS 493613), a lone specimen collected in 1963 in an irrigation ditch that no longer exists near the mouth of the Mulegé estuary; not found during study period. MARSH PARSLEY, SLENDER CELERY.

Apocynaceae

Asclepias albicans S. Watson **Sh.** SCB: widespread and sporadic. *Daniel* 208 (ASU 0013173), 1922 (ASU 0013167); *Valov* 2004198 (HCIB 23900), 2004199 (HCIB 23901), 2005053 (HCIB 21491). JUMETE, YAMETE, MATA CANDELILLA; WAX MILKWEED, WHITE-STEM MILKWEED.

Asclepias curassavica* L. **Ph. RUD: ornamental shrub in central Mulegé, not known to escape; host to Queen butterfly larvae (*Danaus gilippus*). *Howe* s.n. (SD 60915, Mulegé 1964); Valov personal observation (Casa de Cultura, April 2015. <https://www.inaturalist.org/observations/45853928>). CANECILLO, LAURELILLO, HIERBA DE LA CUCARACHA; BLOODFLOWER MILKWEED.

Asclepias subulata Decne. **Ph.** SCB, RUD: widespread, common especially along roadsides. *Valov* 2004208 (HCIB 23908). JUMETE, YAMETE, MATA CANDELILLA; RUSH MILKWEED.

Cryptostegia grandiflora* (Roxb.) R.Br. **Ph, Hf, Vi. RUD, RP: while known for its invasiveness in riparian areas, within the Mulegé oasis it appears to be limited to just a few plants deep within the palm orchard. *Knobloch* 2350 (SD 73686); *Valov* 1244 (HCIB). CUERNO, CHICOTE; RUBBER VINE. *Funastrum heterophyllum* (Torr.) Standl. [In Wiggins as *Sarcostemma cynanchoides* Decne. subsp. *hartwegii* (Vail) R.W.Holm] **Ph, Vi.** RP: uncommon; Mulegé oasis. *Johnston* 3684 (UC 251606); *Valov* 1142 (SD 260885). TALAYOTE; CLIMBING MILKWEED.

Matelea pringlei (A.Gray) Woodson **Ph, Vi.** SCB: widespread, sporadic from Bahía Concepción to at least H. Mulegé; ranges along Gulf Coast and islands from at least Bahía de los Ángeles southward. *Rebman* 4216 (SD 142471); *Valov* 2003076 (HCIB 20134), 2005092 (HCIB 21446), 2005121 (HCIB 22198). TALAYOTE CHINO; PRINGLE MILKVINE.

Pattalias palmeri S. Watson var. *palmeri* [taxonomy based on Fishbein et al. 2017; listed in Wiggins as *Cynanchum palmeri* (S. Watson) S.F. Blake; in Rebman et al. (2016) as *Seutera palmeri* (S. Watson) Fishbein & W.D. Stevens var. *palmeri*] **Ph, Vi.** SCB-WC, D-R, SCB-CB: widespread, common; twining abundantly on other plants or across ground and rocks; BCS endemic, its northern limit around Isla San Marcos and Mulegé. *Rebman* 4220 (SD 142473); *Valov* 2003055 (HCIB 20116), 2003056 (HCIB 20117), 2004200 (HCIB 23902); *Wiggins* 18085 (CAS 2224). PALMER SWALLOWWORT.

Vallesia glabra (Cav.) Link. **Tr, Sh, Hf.** RP: rare except within the Mulegé oasis and along the river basin, often pruned to make an evergreen garden ornamental; more common elsewhere in BCS, esp. in mountainous regions. *Daniel* 1907 (ASU 0012229); *Holler* s.n. (DES 00023965, Rancho El Coyote 1992); *Howe* 4066 (SD 60913); *Johnston* 3694 (UC 251603); *Valov* 2004220 (HCIB 23920). HUITATAVE, OTATAVE, HUEVITO, CRUCECILLO; PEARLBERRY.

Asteraceae

Aldama glomerata (Brandeggee) E.E. Schill & Panero var. *glomerata* [In Wiggins as *Alvordia glomerata* Brandeggee var. *glomerata*] **Sh.** SCB-RH: uncommon; in outwash arroyo from Sierra Azteca on n side of Mulegé River; LC near endemic. *Valov* 2004005 (HCIB 18348). BAJA CALIFORNIA ALVORDIA.

Amauria brandegeana (Rose) Rydb. **Ph.** SCB: widespread and very common, esp. in the Mulegé basin where it is the dominant rock-daisy; LC endemic. *Valov* 2008006 (HCIB 27625), 2009065

- (HCIB); *Zippin* 73 (SD 132187). MANZANILLA; BRANDEGEE ROCK DAISY.
- Amauria rotundifolia* Benth. **Ph.** SCB-WC, **RP:** widespread and common, most likely to occur in moist riparian areas or in shady places along dry water courses, where it may occur alongside *A. brandegeana*; **LC** endemic. *Hodgson s.n.* (ASU 0005554, Bahía Concepción, 1984); *Holler s.n.* (DES 00023965, Bahía Concepción, 1982); *Johnston* 3676 (NY 359647); *Valov* 2003045 (HCIB), 2003046 (HCIB), 2003047 (HCIB), 2003059 (HCIB), 2006063 (22751). MANZANILLA; BAJA CALIFORNIA ROCK DAISY.
- Ambrosia ambrosioides* (Cav.) W.W.Payne **Ph, Hf.** **RP,** SCB-WC: sporadic, Mulegé basin west of oasis; in 2012 began to form large, persistent stands in the oasis between the dam and bridge. *Palmer* 21 (NY 359689); *Valov* 2010032 (SD 208214). CHICURA DEL ARROYO; CANYON RAGWEED, BIG BUR-SAGE.
- Ambrosia confertiflora* DC. **An.** **RP,** **RUD:** Mulegé basin mainly in disturbed soils, especially around habitation or vacant lots. *Valov* 2005097 (HCIB 21451). ESTAFIATE; WEAK-LEAF RAGWEED, SLIM-LEAF RAGWEED.
- Ambrosia divaricata* (Brandeggee) W.W.Payne **Sh.** SCB-RH: rare in study area; Mulegé Valley near El Rastro/La Ventana and hillside of arroyo south of town. *Moran* 9043 (SD 66090); *Valov* 1209 (SD 265546). VIZCAÍNO BUR-SAGE.
- Ambrosia magdalenae* (Brandeggee) W.W.Payne. **Sh.** SCB-GYP: uncommon in area; Punta Chivato area. *Valov* 2009004 (SD 192852). HUIZAPOL; ESTAFIATE; MAGDALENA RAGWEED.
- Ambrosia monogyra* (Torr. & A.Gray) Strother & B.G.Baldwin [In Wiggins as *Hymenoclea monogyra* Torr. & A.Gray] **Ph, Hf.** SCB-WC: rare; a few plants along the Mulegé Valley main arroyo and oasis. *Valov* 2009004 (SD 192852), 1202 (SD 265548). ROMERILLO; SINGLEWHORL BURROBUSH, LEAFY BURROBUSH.
- Baccharis salicifolia* (Ruiz & Pav.) Pers. subsp. *salicifolia* [In Wiggins as *Baccharis glutinosa* Pers. misappl., *Baccharis viminea* DC.] **Sh, Hf.** **RP:** few plants on south bank of the Mulegé River, possibly extirpated by dredging within the oasis in 2015. *Valov* 1068 (SD 260893). GUATAMOTE; MULE FAT, SEEP WILLOW.
- Bahiopsis triangularis* (M.E.Jones) E.E.Schill. & Panero **Sh.** SCB, SCB-GYP: widespread and sporadic. *Valov* 2003007 (HCIB 20073); *Valov* 2004103 (HCIB). TACOTE, MARGARITA, RAMITA DE LOS CANTILES; BAJA CALIFORNIA GOLDENEYE.
- Bajacalia crassifolia* (S.Watson) Loockerman, B.L.Turner & R.K.Jansen [In Wiggins as *Porphyrillum crassifolium* S.Watson] **Sh.** SCB-CB, SCB-RH: widespread, common along coast; new growth esp. succulent, with reddish oil glands on leaf tips and phyllaries, pungent; **LC** near endemic. *Boyd* 5964 (UC 1605487); *Clemons* 1401 (SD 119004); *Domínguez León* 3896 (HCIB 22408); *Howe* 4452 (SD 80816); *Keil* 16642 (UC 1750169); *Rebman* 4210 (SD 142458); *Sanders* 6373 (UCR 42935), 6387 (UCR 43193); *Valov* 2004052 (HCIB), 2004211 (HCIB 23911); *Webster* 19602 (SD 97427). HIERBA DEL VENADO, PAPALOQUELITE, DAMIANA (LOCALLY); GULF COAST BAJACALIA.
- Bebbia atriplicifolia* (A.Gray) Greene [In Wiggins as *Bebbia juncea* (Benth.) Greene var. *atriplicifolia*] **Sh.** SCB-WC, SCB-AF: uncommon and sporadic; several sites at Punta Arena and in the Mulegé Valley; **BCS** endemic. *Valov* 2005140 (HCIB 23200), 2008053 (HCIB 24030), 2010034 (SD 208216). APÁ, APÁN, BARBA DE CHIVO; CAPE SWEETBUSH.
- Bebbia juncea* (Benth.) Greene var. *aspera* Greene **Sh.** SCB: not found during study and is better known from **BC** state. *Carter s.n.* (ARIZ 126443, Palo Verde 1950). APÁ, APÁN, BARBA DE CHIVO, HIERBA CENIZO; RUSH SWEETBUSH.
- Bebbia juncea* (Benth.) Greene var. *juncea* **Sh.** SCB, D-R: widespread, common and abundant. *Carter* 2821 (UC 1094966); *Gander* 9628 (SD 29318); *Howe* 4015 (SD 60908); *Palmer* 22 (NY 362099); *Rose* 16657 (NYBG 362098); *Valov* 2003086 (HCIB 20143), 2004136 (HCIB 4459), 2004137 (HCIB 23875). APÁ, APÁN, BARBA DE CHIVO, HIERBA CENIZA; SOUTHERN RUSH SWEETBUSH.
- Blumea viscosa* (Mill.) V.M.Badillo [syn = *Pseudoconyza viscosa* (Mill.) D'Arcy, *Conyza lyrata* Kunth] **An, Hf.** **RP:** rare, known from one small population near bank of the Mulegé River that appeared after 2012 flood and was continuing to spread in 2017. *Valov* 1186 (HCIB), 1316 (SD 265550). STICKY BLUMEA, CLAMMY FALSE OXTONGUE.
- Brickellia brandegeei* B.L.Rob. [In Wiggins as *Brickellia macromeria* B.L.Rob.] **Sh.** SCB-AF, SCB-RH: occasional at least around the Mulegé basin, often growing within larger shrubs. *Valov* 1188 (SD 265552). BRANDEGEE BRICKELL-BUSH.
- Brickellia glabrata* (Rose) B.L.Rob. **Sh.** SCB-RH: uncommon, known only from one site on hill above the Mulegé River bank but expected elsewhere; **LC** endemic. *Valov* 2005025 (HCIB 21476), 2005062 (HCIB 21499). SMOOTH BRICKELL-BUSH.
- Coreocarpus parthenioides* Benth. var. *parthenioides* **An.** SCB: widespread, common, often abundant; **LC** endemic. *Daniel* 1897 (ASU 0013673); *Smith* 3913 (BCMEX 2575); *Valov* 2004013 (HCIB 20597), 2004074 (HCIB), 2005026 (HCIB 21477), 2009054 (HCIB 27639); *Walker* 79H34 (NY 416846). ACEITILLA BLANCA; WHITE-RAY COREOCARPUS.
- Coulterella capitata* Vasey & Rose **Ph.** **MG.** **BCS** endemic; known from one specimen collected south of Coyote Bay, Bahía Concepción, 1994. Not found during study period. *Anderson* 1163 (ASU 0013728). GULF COULTERELLA.

Eclipta prostrata (L.) L. [In Wiggins as *Eclipta alba* (L.) Hasskarl] **An**, **Hf**. **RP**: first seen in 2002 and absent along river 2007–2012 due to frequent, destructive floods; rebounded in 2013 and still present in abundance in early 2018 along the river and in some dry channels. *Valov 1154* (SD 260896). CLAVEL DE POZO; FALSE DAISY.

Encelia farinosa Torr. var. *phenicodonta* (S.F.Blake) I.M.Johnst. **Sh**. **SCB-WC**, **SCB-RH**, **SCB-GYP**: widespread, common and abundant; this variety which has brown disk flowers is recognized separately in Rebman et al. (2016) because it appears to have a different geographical distribution, occurring mostly at lower elevations and in drier habitats. *Roberts s.n.* (SD 182625, San Bruno 2007); *Valov 2003051* (HCIB 20113), *2004021* (HCIB 22627); *Webster 19641* (SD 97429). INCIENSO; BRITTLEBUSH.

Erigeron bonariensis* L. [In Wiggins as *Conyza bonariensis* (L.) Cronquist]. **An. **RP**, **RUD**: uncommon; several populations found in dry channel in the Mulegé oasis after 2012 flood and into 2017. *Valov 1190* (HCIB). ESCOBA DE ARROYO; FLAX-LEAF FLEABANE/HORSEWEED.

Flaveria trinervia (Spreng.) C.Mohr **Ph**. **RUD**: known only from one plant in the Mulegé oasis in 2017. Considered an exotic by some, but treated in Rebman et al. (2016) as likely native to BCS. *Valov 1303* (SD 265557). RETAMA, TAMBOCHE; CLUSTERED YELLOWTOPS.

Gnaphalium palustre Nutt. **An**, **Hf**. **RP**: rare; known only from a few plants in several dry channels in the Mulegé oasis after the 2012 flood, seen once again in 2014. *Valov 1161* (HCIB). WESTERN MARSH CUDWEED, LOWLAND CUDWEED, MARSH EVERLASTING.

Gundlachia diffusa (Benth.) G.L.Nesom [In Wiggins as *Haplopappus sonorensis* (A.Gray) S.F.Blake; syn = *Xylothamia diffusa* (Benth.) G.L.Nesom] **Sh**. **D**, **SCB-AS**, **SCB-CB**: widespread, common and often abundant; close to coast mostly in sandy or saline soils. *Rebman 6094* (SD 146357); *Valov 2004164* (HCIB 22218); *Wolfson 867* (SD 93765). ROMERILLO AMARGO; HIERBA DEL PASMO.

Gutierrezia ramulosa (Greene) M.A.Lane [In Wiggins as *Greenella ramulosa* Greene] **An**. Not found during study period. Atwood voucher image was reviewed by J.P. Rebman and in a personal communication (Sep. 2013), he stated it had been misidentified as *G. microcephala*. **SCB-RH**: ridge-top above Punta Arena. *Atwood 18893* (NY 422008). BAJA CALIFORNIA MATCHWEED/SNAKEWEED.

Heliopsis anomala (M.E.Jones) B.Turner [In Wiggins as *Heliopsis parviflora* A.Gray var. *rubra* (Fish.) Wiggins] **Ph**. **SCB-RH**, **SCB-WC**: uncommon; LC near endemic. *Moran 9042* (SD 66659); *Valov 2005042* (HCIB 21486), *2005066* (HCIB 22842). GIRASOL; BAJA CALIFORNIA OX-EYE.

Hofmeisteria fasciculata (Benth.) Walp. var. *fasciculata* [In Wiggins as *Hofmeisteria fasciculata*

(Benth.) Walp var. *pubescens* (S.Watson) B.L.Rob] **Ph**. **SCB-WC**, **SCB-CB**, **SCB-RH**, **D-R**: widespread, common and highly variable species. *Baker 8717* (ASU 0021314); *Clemons 1400* (SD 119007); *Daniel 1902* (ASU 0021315); *de Groot 4879* (SD250207); *Dillon 1955* (UCR 29679); *Gallagher 167* (ASU 0021310); *Hill 8* (SD 131192); *Reeves 4737* (ASU 0021312); *Valov 2004003* (HCIB), *2004081* (HCIB 23855), *2004123* (HCIB 23870). COAST HOFMEISTERIA.

Leucosyris crispa (Brandeggee) Pruski & R.L.Hartm. [In Wiggins as *Machaeranthera crispa* (Brandeggee) B.L.Turner & D.B.Horne] **Sh**. **SCB-AS**: known only from one large population in the Mulegé Valley near the horse racetrack in the area called *El Rastro* that was subsequently buried for the most part by debris from the 2015 dredging/canal project. No plants located to date, but initial population and range unknown for the immediate area. BCS near endemic, known from around San Ignacio and the Sierra de la Giganta (Rebman et al. 2016). *Valov 1226* (SD 265560). BAJA CALIFORNIA TANSYASTER.

Malacothrix xanti A.Gray **An**. **SCB**: rare; BCS endemic. *Moran 9050* (SD 66045); *Valov* personal observation (north side of the Mulegé River in shady arroyo 2002); not found during study period. XANTU DESERT-DANDELION.

Nicolletia trifida Rydb. **Ph**. **SCB**, **D-R**: widespread, common and abundant especially in silty or sandy soils; herbage succulent, pungent. LC endemic. *Perrill 5501* (UCR 69614); *Pinkava 12239* (ASU 0022950); *Porter 13840* (BCMEX 12614); *Valov 2003016* (HCIB 20082), *2003017* (HCIB 20083), *2003061* (HCIB), *2003065* (HCIB 20124), *2004131* (HCIB 23872). HIERBA DEL VENADO, MANZANILLA; BAJA CALIFORNIA NICOLLETIA.

Palafoxia linearis (Cav.) Lag. var. *glandulosa* B.L.Turner & M.I.Morris **Ph**. **D-R**, **D-F**: uncommon, sporadic on dunes with low human impact. Local specimens by *Valov* of this variety and var. *linearis* do not completely meet characteristics as detailed by Wiggins (1980) of either var. *glandulosa* or var. *linearis* but instead appear to be intermediary to the two (e.g., leaf blades do not only have dense, strigose hairs, but also blunt glandular hairs beneath the hairs; midstems with both blunt and tack-like glands as well as sparse hairs; all herbage slightly tacky to touch). *Franklin 5724* (NY 425644); *Valov 1108* (HCIB 27619). PENINSULAR PALAFOX.

Palafoxia linearis (Cav.) Lag. var. *linearis* **Ph**. **D-R**, **D-F**. See note above for var. *glandulosa* as varieties may be intergrading in this area. *Pinkava P-12244* (ASU 0038707); *Taylor 6313* (UC 1731902); *Valov 2005104* (HCIB 21454), *2006060* (HCIB 22833). COAST PALAFOX, BEACH SPANISH NEEDLE.

Parthenium confertum A.Gray [In Wiggins as *Parthenium confertum* A.Gray var. *lyratum* (A.Gray) Rollins] **Ph**, **Hf**. **RP**: rare; known only from one small population (<5 plants) in dry channel in the

- Mulegé oasis between 2012 and 2014. This species is rare and elsewhere, is only known from a few populations in the Sierras La Giganta and La Libertad. BCS specimens do not fit well with the characters of the species and may be an undescribed species (Rebman et al. 2016). *Valov 1182* (SD 265564). CONFITILLO; GRAY'S FEVERFEW.
- Pectis papposa* Harv. & A.Gray var. *papposa* An. SCB: widespread and common, especially in sandy or silty soils. *Gander 6917* (SD 29306); *Rebman 4228* (SD 142161); *Valov 2004008* (HCIB 20600), *2004022* (HCIB), *2004023* (HCIB), *2004180* (HCIB 23884), *2009053* (HCIB 27638). MANZANILLA DEL MONTE; DESERT CHINCHWEED, MANY-BRISTLE CHINCHWEED.
- Pectis rusbyi* Greene ex A.Gray [In Wiggins as *Pectis palmeri* S.Watson] An. SCB-RH, SCB-AF: common; large populations first noted on bajadas all along Bahía Concepción after 2013 hurricane. *Medel Narváez 2012–133* (HCIB 27887); *Valov 1231* (SD 265566), *1233* (SD 260906). Includes a number of specimens that were identified as *P. filipes* from around Bahía Concepción (e.g., *Gentry 4068* (RSA 471751) per Rebman et al. (2016). MANZANILLA; RUSBY CHINCHWEED.
- Pectis vollmeri* Wiggins An. SCB-RH, SCB-AF: widespread and common after summer rains, generally in heavy or rocky soils; BCS endemic. *Burgess 6134* (ARIZ 235875); *Daniel 2390* (ASU 0027230); *Hammerly 137* (SD40487); *Hodgson 3090* (ASU 0027232); *Quirk s.n.* (Bahía Concepción 1981, DES 00022564); *Rebman 3355* (SD 139329), *4230* (SD 142460); *Valov 2004017* (HCIB), *2004153* (HCIB 22211), *2009081* (HCIB); *Wiggins 11407* (NY 230941). MANZANILLA DEL MONTE; VOLMER'S CHINCHWEED.
- Perityle aurea* Rose Ph. D-R: rare in area; known only from Punta Chivato, though seen outside of study area to north near Santa Rosalía; LC near endemic with its southern limit around Mulegé; also known from Isla San Esteban, Sonora. *Schneider s.n.* (SD 158332, Punta Chivato 2003); *Valov 2009003* (SD 192856). MANZANILLA; GULF ROCK-DAISY.
- Perityle californica* Benth. An. SCB, RP: widespread, common. *Daniel 1894* (ASU 0028833); *Felger 19972* (ASU 0028810); *Gander 9626* (SD 29316); *Hodgson s.n.* (ASU 0028807, Bahía Concepción 1984); *Smith 3914* (BCMEX 2574); *Valov 2003044* (HCIB 20107), *2003060* (HCIB 20121), *2005063* (HCIB 21505); *Walker 79H33* (NY 426023). MANZANILLA; BAJA CALIFORNIA ROCK-DAISY.
- Perityle crassifolia* Brandegees var. *robusta* (Rydb.) Everly [In Wiggins as *Perityle incompta* Brandegees] Ph. SCB, D-R: variety of scrub communities along coast and in alkaline soils; northern limit on Gulf coast around Mulegé; BCS endemic. *Daniel 1920* (ASU 0028842), *2394* (ASU 0028841); *Valov 2006062* (HCIB 23452), *2007079* (HCIB 25313). MANZANILLA; COASTAL ROCK-DAISY.
- Perityle emoryi* Torr. An. SCB-CB, SCB-RH: widespread, common. *Anderson 1068* (UTC 00222454); *Porter 13838* (BCMEX 12613); *Valov 2009000* (SD192857). MANZANILLA BLANCA; EMORY ROCK-DAISY, DESERT ROCK-DAISY.
- Pleurocoronis laphamioides* (Rose) R.M.King & H.Rob. [In Wiggins as *Hofmeisteria laphamioides* Rose var. *laphamioides*, *Hofmeisteria laphamoides* Rose var. *pauciseta* (I.M.Johnst.) S.F.Blake] Sh. SCB-CB: uncommon; mainly on coastal cliffs; known only from bluffs at El Faro and El Gallito in H. Mulegé but expected elsewhere in area. *Sanders 6371* (UCR 42932); *Valov 2008062* (SD 192858); *Hill 10* (SD 131193). PENINSULAR ARROW-LEAF.
- Pluchea carolinensis* (Jacq.) G.Don Sh, Hf. RP: known only from several plants along the Mulegé River bank; uncommon. *Valov 1144* (SD 265567), *1192* (HCIB). CACHANILLA, LENGUA DE BUEY; CURE FOR ALL.
- Porophyllum gracile* Benth. [In Wiggins as *Porophyllum pinifolium* Rydb., *Porophyllum cedrense* Rose & Standl. ex Rydb.] Ph. SCB: widespread, common; highly variable. *Dillon 1960* (UCR 29645); *Hodgson 3088* (DES 00027258); *Rebman 4225* (SD 142457); *Roth 1366* (UC 1538363); *Sanders 1960* (UCR 27784); *Valov 2004096* (HCIB), *2004160* (HCIB 23878), *2004132* (HCIB 23873). YERBA DEL VENADO, OJO DEL PESCADO; SLENDER PORELEAF, ODORA.
- Pseudognaphalium stramineum* (Kunth) Anderb. [In Wiggins as *Gnaphalium chilense* Spreng] Ph, Hf. RP: known only from a small, transient population along the shady banks of the Mulegé River post-2012 flood and recurring once in 2017. *Valov 1088* (HCIB 27605). LENGUA DE BUEY, GORDO-LOBO; COTTONBATTING PLANT, COTTON CUD-WEED.
- **Sonchus oleraceus* L. An. RUD, RP: widespread, often common weed around habitation and in agricultural and other disturbed areas. *Valov 2005081* (HCIB 21436). CHINITA, LECHUGUILLA, LECHUGUITA, ENDIVIA; COMMON SOW-THISTLE.
- Trichoptilium incisum* (A.Gray) A.Gray An. SCB: widespread but uncommon, often after summer rains. *Valov 2003032* (HCIB 20096), *2003033* (HCIB 20097), *1109* (HCIB 27620). DESERT YELLOW-HEAD, YELLOWDOME.
- Trixis californica* Kellogg var. *californica* [In Wiggins as *Trixis angustifolia* DC. misappl.] Sh. SCB-WC, SCB-RH: widespread but sporadic. *Dillon* (UCR 29656); *Valov 2008000* (HCIB 23438), *2009082* (HCIB). SANTA LUCÍA; CALIFORNIA TRIXIS, AMERICAN THREEFOLD.
- **Verbesina encelioides* (Cav.) A.Gray subsp. *encelioides* Ph. RP, RUD: uncommon, occasional; Mulegé Valley and oasis in disturbed soils. *Valov 1181* (SD 260911). GIRASOL; GOLDEN CROWN-BEARD.
- Xanthisma incisifolium* (I.M.Johnst.) G.L.Nesom [In Wiggins as *Haplopappus spinulosus* (Pursh) DC.

subsp. *incisifolius* (I.M.Johnst.) H.M.Hall] **Subsh.** SCB-CB: rare in area, known only from sandy areas on coastal bluffs to north of Punta Cacarizo (at Punta Chivato). *Valov 2005107* (HCIB 21457). GULF TANSY-ASTER.

Bataceae

Batis maritima L. **Subsh.** CW, MG: widespread and common. *Valov 2004097* (HCIB), *2004165* (HCIB), *2005119* (HCIB 22196), *2005122* (HCIB 22843); *Wolfson 865* (SD 93917), *874* (SD 93932). DEDITO; SALTWORT, BEACHWORT, TURTLE-WEED.

Bignoniaceae

Tecoma stans (L.) Juss ex Kunth. var. *stans* **Sh.** RUD: widespread; commonly planted for fencing and decoration but may also occur naturally in shady, riparian areas along the Mulegé River. *Valov 2005083* (HCIB 21438). PALO DE ARCO; YELLOW TRUMPET BUSH.

*§ *Spathodea campanulata* P.Beauv. **Tr.** RUD: occasional ornamental across area. Valov personal observation (Mulegé, Apr. 2010. <https://www.inaturalist.org/observations/38051061>). TULIPÁN AFRICANO, ÁRBOL DE FUEGO; AFRICAN TULIP TREE.

Boraginaceae

Taxonomy follows Luebert et al. (2016).

Antiphytum peninsulare (Rose) I.M.Johnst. **Ph.** SCB-WC: known from several plants in a large outwash arroyo from Sierra Azteca on north side of the Mulegé River; BCS endemic restricted to area between Santa Rosalía and Mulegé, and on Isla San Marcos. *Valov 2004046* (HCIB 17418), *2005017* (HCIB 21471). PENINSULAR SAUCER-FLOWER.

Cryptantha maritima (Greene) Greene var. *pilosa* I.M.Johnst. **An.** SCB-CB: known from Isla Blanca in Bahía Concepción; not found during study period but could be expected on adjacent mainland near the coast; uncommon elsewhere and known mainly from along the eastern coast of the peninsula and adjacent Gulf islands as far south as Loreto. *Wiggins 17407* (SD 94585). NIEVITAS, PELUDA; WHITE-HAIR CRYPTANTHA.

Johnstonella angelica (I.M.Johnst.) Hasenstab & M.G.Simpson [In Wiggins as *Cryptantha angelica* I.M.Johnst.] **An.** SCB: widespread throughout the study area, but abundance unknown due to difficulty with field identification of nutlets in similar looking taxa. *Valov 1184* (SD 265576). NIEVITAS, PELUDA; NARROWLEAF CRYPTANTHA, DESERT CRYPTANTHA.

Johnstonella echinosepala (J.F.Macbr.) Hasenstab & M.G.Simpson [In Wiggins as *Cryptantha echinosepala* J.F.Macbr.] **An.** SCB: found throughout the study area, but abundance unknown due to

difficulty with field identification of nutlets in similar looking taxa; BCS endemic, northern range in vicinity of Mulegé and adjacent Gulf Islands. *Valov 1106* (HCIB 27616), *2010036* (SD 208222). NIEVITAS, PELUDA; GIGANTA CRYPTANTHA.

Johnstonella grayi (Vasey & Rose) Hasenstab & M.G.Simpson var. *grayi* [In Wiggins as *Cryptantha grayi* (Vasey & Rose) J.F.Macbr. var. *grayi*] **An.** SCB, D-R: widespread, common; LC endemic. *Valov 2004083* (HCIB), *2004093* (HCIB), *2004099* (HCIB 23859), *2010037* (SD 208221), *1183* (SD 265577). NIEVITAS, PELUDA; GRAY CRYPTANTHA.

Brassicaceae

Brassica rapa* L. [In Wiggins as *Brassica campestris* L.] **An. RUD: rare (possible agricultural escape) found along the bank of the Mulegé estuary. Rebman et al. (2016) states that this specimen, a record for BCS, is unusual with buds that overtop the flowers. *Valov 2010040* (SD 208224). NABO DEL CAMPO; FIELD MUSTARD.

Brassica tournefortii* Gouan **An. RUD, RP, SCB-WC: Agricultural escape, beginning to aggressively invade disturbed areas along the Mulegé basin mostly east of the agricultural fields. *Valov 2010041* (SD 208225). MOSTAZA, MOSTACILLA; SAHARAN MUSTARD.

Descurainia pinnata (Walter) Britton subsp. *brachycarpa* (Richardson) Detling [In Wiggins as *Descurainia pinnata* subsp. *halictorum* (Cockerell) Detling, *Descurainia pinnata* subsp. *menziesii* (DC.) Detling] **An, Hf.** RP: disturbed areas along ditches and trails in the Mulegé oasis. This subspecies is considered to include hybrids with other species (Rebman et al. 2016). *Valov 1150* (HCIB 24196). PAMITA; WESTERN TANSY MUSTARD.

Draba cuneifolia Nutt. ex Torr. & A.Gray var. *integrifolia* S.Watson **An, Hf.** RP: rare, known only from the Mulegé oasis in several dry ditches. See Rebman et al. (2016) for more on taxonomy of this species. *Valov 1151* (SD 265581). WEDGELEAF DRABA, DESERT WHITLOW.

Dryopetalon palmeri (S.Watson) O.E.Schulz [In Wiggins as *Dryopetalon purpureum* Rollins (according to Al-Shebaz 2007)] **An.** SCB: uncommon; Mulegé, Bahía Concepción. *Baker 8722* (BCMEX 6129); *Daniel 2377* (ASU 0037290); *Dillon 1968* (UCR 29686); *Gallagher 83-16* (ASU 0037286); *Moran 9036* (SD 66638); *Valov 2003039* (HCIB 20103), *2003040* (HCIB 20104), *2004012* (HCIB 20147), *2004028* (HCIB 20151), *2006064* (HCIB). PALMER ROCK- MUSTARD.

Eruca vesicaria* (L.) Cav. subsp. *sativa* (Mill.) Thell. **An. RUD: rare, known from one ditch along Hwy 1 near the bridge. *Valov 1107* (HCIB 27618). ARUGALA, RUCOLA SILVESTRE; SALAD ROCKET, GARDEN ROCKET.

Lepidium didymum* L. [syn = *Coronopsis didymus* (L.) Smith] **An. RUD: rare, known only from downtown Mulegé, mainly around Plaza Benito Juárez in garden area and along cracks in the sidewalk; rare elsewhere on peninsula. *Valov* 1185 (HCIB). MASTUERZO DE LAS INDIAS; LESSER WART-CRESS, LESSER SWINE-CRESS.

Lepidium lasiocarpum Nutt. ex Torr. & A.Gray subsp. *latifolium* C.L.Hitchc. **An.** RUD, RP, SCB-WC: widespread, uncommon. *Johnston* 3700 (CAS 78016); *Valov* 2005020 (HCIB 21473), 2005079 (HCIB 21434). LENTEJILLA; SAND PEPPERGRASS.

Lyrocarpa coulteri Hook. & Harv. var. *apiculata* Rollins **Ph.** SCB: widespread, sporadic, especially growing from within the shade of other shrubs; BCS endemic. *Valov* 2003006 (HCIB 20072), 2004000 (HCIB 20146), 2004117 (HCIB), 2006061 (HCIB 22834). GIGANTA LYREPOD.

Sisymbrium irio* L. **An. RUD, SCB-WC, RP: widespread, common weed. *Valov* 2005001 (HCIB 21460), 2005036 (HCIB 21480), 2010044 (SD 208226), 1152 (HCIB). MOSTAZA, MOSTACILLO COMÚN, PAMITÓN; LONDON ROCKET.

Burseraceae

Bursera epinnata (Rose) Engl. **Tr.** SCB, D-R: all specimens are from beaches in Bahía Concepción, but it is probably more common across the study area; BCS endemic. *Burgess* 6133 (SD 116937); *Rzedowski s.n.* (ARIZ 181725, Bahía Concepción 1968); *Valov* 1228 (SD 260928), 1229 (SD 260927). COPAL BLANCO, TOROTE; SOUTHERN ELEPHANT TREE.

Bursera hindsiana (Benth.) Engler **Tr.** SCB, D-R: widespread, common. *Daniel* 1921 (ASU 0038464); *de Groot* 4885 (SD 50235); *Shreve s.n.* (ARIZ 68798, near San Bruno 1934); *Valov* 2004155 (HCIB 22213); *Weeks* 00-X-6-7 (NY 1242094). COPAL, TOROTE PRIETO; RED ELEPHANT TREE.

Bursera microphylla A.Gray **Tr.** SCB, D-R: widespread, common. *Anderson* 1075 (ASU 0039184); *Carter* 1983 (UC 915796); *Daniel* 1914 (ASU 0038503); *de Groot* 4885 (SD 250235); *Valov* 2003048 (HCIB 20111), 2004212 (HCIB 23912); *Webster* 19606 (SD 97457); *Wiggins* 5459 (UC 660955). TOROTE, TOROTE COLORADO; LITTLE-LEAF ELEPHANT TREE.

Cactaceae

Cochemia poselgeri (Hildm.) Britton & Rose [In Wiggins as *Cochemia poselgeri* Hildm. (spelling variant)] **Sc.** SCB, D-R: widespread, sporadic, often found growing out from beneath other shrubs or trees with stems a meter or more long; BCS endemic. *P. Gallagher* 257 (ASU 0052586); *Lindsay* 3007 (SD 87013). BIZNAGUITA, VIEJITO; BAJA CALIFORNIA COCHEMIEA.

Cylindropuntia alcahes (F.A.C.Weber) F.M.Knuth var. *alcahes* [In Wiggins as *Opuntia brevispina*

H.E.Gates, *Opuntia echinocarpa* Englm. & J.M.Bigelow var. *nuda* J.M.Coult.] **Sc.** SCB: widespread and common; LC endemic. Flowers in this area gen. greenish-yellow, sometimes slightly red-tinged. *Baker* 8716 (ASU 0054482); *Gallagher* 169 (ASU 0054498); *Pinkava* 14100 (ASU 0054497); *Valov* 2005059 (HCIB 21507), 2005076 (HCIB 21506). CHOLLA (CHOYA) BARBONA, CLAVELINA; PENINSULAR CHOLLA.

Cylindropuntia cholla (F.A.C.Weber) F.M.Knuth [In Wiggins as *Opuntia cholla* F.A.C.Weber] **Sc.** SCB, D: widespread; the most common and abundant cholla in the area, often forming dense stands; can be a dominant plant almost to the point of monoculture in heavily grazed or disturbed soils. *Valov* 2005098 (HCIB 21508), 2005099 (HCIB). CHOLLA (CHOYA), CHOLLA PELONA; BAJA CALIFORNIA CHOLLA, CHAINLINK CHOLLA.

Cylindropuntia cholla × *C. alcahes* **Sc.** SCB-RH. *Baker* 8723 (ASU 0054490). Not observed during this study.

Cylindropuntia waltoniorum Rebman **Sc.** SCB-RH: known only from one plant near base of Cerro el Rebaje (H. Mulegé). Possibly of hybrid origin between *C. lindsayi* and *C. alcahes* var. *alcahes* (Rebman et al. 2016). LC endemic. *Lindsay* 3005 (SD 84078); *Valov* 1180 (SD). WALTON CHOLLA.

Echinocereus brandegeei (J.M.Coult.) K.Schum. **Sc.** SCB-RH, SCB-AF, SCB-CB: widespread, common and abundant; LC endemic. *Knobloch* 2339 (SD 73689); *Moran* 18840 (SD 94417). PITAYITA, BIZNAGUITA, CASA DE RATA, VIEJITO; BRANDEGEE HEDGEHOG.

Ferocactus peninsulae (F.A.C.Weber) Britton & Rose var. *peninsulae* **Sc.** SCB: widespread, common and abundant; LC endemic. *Reeves* R-450 (ASU 0053784). BIZNAGA; PENINSULAR BARREL CACTUS.

Ferocactus rectispinus (Engelm.) Britton & Rose [syn = *Ferocactus emoryi* (Engelm.) Orcutt subsp. *rectispinus* (Engelm.) N.P.Taylor] **Sc.** SCB-WC, SCB-RH: widespread, rare at lower elevations but more common at higher elevations as one moves west toward the Sierras; BCS endemic. Listed as NOM A. *Lindsay s.n.* (SD 84097, Coyote Bay 1951); *Valov* 1094 (HCIB 27611); *Wiggins* 11414 (SD 44907). BIZNAGA, BIZNAGA DE ESPINAS RECTAS; GIGANTA BARREL CACTUS, STRAIGHT-SPINE BARREL CACTUS.

Grusonia invicta (Brandeggee) E.F.Anderson [In Wiggins as *Opuntia invicta* Brandeggee] **Sc.** SCB-GYP, SCB: known only from the Punta Chivato area and the vicinity of Rancho Año Nuevo at Hwy 1 (where it is common), as well as from one rocky bluff above the Mulegé prison. It does not seem to occur in the Mulegé Valley or along Bahía Concepción, at least on lower hillsides or bajadas; LC endemic. *Valov* 2010054 (SD 208227). CASA RATA; BAJA CALIFORNIA CLUB-CHOLLA, DAGGER CACTUS.

Lophocereus schottii (Engelm.) Britton & Rose var. *schottii* Sc. SCB, D-R: widespread, common in a variety of habitats. *Moran 7471* (SD 49926); *Valov 1096* (HCIB 27613). GARAMBULLO, SENITA; OLD-MAN CACTUS, SENITA CACTUS.

Mammillaria dioica K.Brandegee Sc. SCB, D-R: widespread, common and abundant, often found in small colonies near base of other plants. *Valov 1084* (HCIB 27601). VIEJITO, PITAYITA; FISH-HOOK CACTUS, PINCUSHION CACTUS.

§ *Mammillaria hutchisoniana* (H.E.Gates) Boed. Sc. SCB-CB: rare in area, known only from near mouth of the Mulegé River; widespread LC endemic from c BC southward. Valov personal observation (Mulegé, 2015. <https://www.inaturalist.org/observations/38050676>) and preliminary det. by Rebman May 2015. VIEJITO; HUTCHISON NIPPLECACTUS, PINCUSHION CACTUS.

§ *Opuntia* sp. Sc. SCB-RH: known only from one plant near base of Cerro el Rebaje (H. Mulegé). Valov personal observation (Cerro el Rebaje, April 2013. <https://www.inaturalist.org/observations/38050863>). NOPAL; PRICKLY PEAR.

Pachycereus pringlei (S.Watson) Britton & Rose Sc. SCB, D-R: widespread, common; LC near endemic. *Valov 1091* (HCIB 27608), *1092* (HCIB 27609). CARDÓN, CARDÓN PELÓN, SAHUESO; ELEPHANT CACTUS.

Peniocereus johnstonii Britton & Rose Sc. SCB-WC: known from only one specimen growing up from within a shrub along the edge of an arroyo near H. Mulegé, but expected elsewhere in area. BCS endemic. *Valov 1342* (SD 265583). SARAMATRACA; JOHNSTON NIGHT-BLOOMING CEREUS.

Peniocereus striatus (Brandege) F.Buxbaum [In Wiggins as *Wilcoxia striata* (Brandege) Britton & Rose; *Wilcoxia diguettii* (F.A.C.Weber) Diguett & Guillaumin] Sc. SCB-RH, SCB-AF, SCB-AS: typically described as found growing within other shrubs, but a number of plants were found on different rocky hillsides and a bajada growing alone in an open, prostrate to spreading manner. *Dimmitt s.n.* (ARIZ 318978, Bahía Concepción 1993); *Moran 9040* (SD 60743); *Valov 1245* (HCIB). RACAMATRACA, SACAMATRACA; DAHLIA-ROOT CEREUS.

Stenocereus gummosus (Engelm.) A.C.Gibson & K.E.Horak [In Wiggins as *Machaerocereus gummosus* (Engelm.) Britton & Rose] Sc. SCB, D-R: widespread, common species often forming dense, impenetrable thickets as its drooping stems root and then send out their own new upright stems where they touch the ground. *Valov 2004174* (HCIB 22223). PITAHAYA (PITAYA) AGRIA; GALLOPING CACTUS, SOUR PITAYA.

§ *Stenocereus thurberi* (Engelm.) F.Buxbaum [In Wiggins as *Lamaireocereus thurberi* (Engelm.) Britton & Rose var. *thurberi*] Sc. SCB, D-R: widespread and common throughout numerous habitats. Valov personal observation (<https://>

www.inaturalist.org/observations/38051063, 2004). PITAHAYA (PITAYA) DULCE; ORGAN PIPE CACTUS.

Capparaceae

Atamisquea emarginata Miers ex Hook. & Arn. Sh. D-R, SCB-AF: widespread, fairly common. *Valov 2005100* (HCIB 21452). JUAIVEN, PALO HEDIONDO, PALO ZORILLO; VOMIT BUSH.

Caryophyllaceae

Drymaria debilis Brandege An. SCB-RH, SCB-WC: shady, often gravelly places; BCS endemic. *Daniel 1925* (ASU 0039161); *Holler s.n.* (DES 00068069, Bahía Concepción 1982); *Moran 9041* (SD 66653); *Moran 9054* (SD 66652); *Valov 2004092* (HCIB), *2004094* (HCIB), *2009080* (HCIB). CAPE DRYMARY.

Drymaria holosteoides Benth. var. *holosteoides*. An. D-R, SCB-AF, SCB-CB: widespread, common close to coast; LC endemic. *Daniel 2379* (ASU 0039184); *Dillon 1958* (UCR 29678); *Gallagher 166* (ASU 0039179); *Gander 9797* (SD 29312); *Gentry 4059* (UC 709088); *Hodgson 3103* (DES 00027468); *Perrill 5502* (UCR 69558); *Valov 2003022* (HCIB 20088); *Van Devender 449* (BCMEX 11579); *Wiggins 5456* (SD 660769). RAMITAS GOLONDRI-NA; THICK LEAF DRYMARY, DESERT DRYMARY.

Casuarinaceae

**Casuarina equisetifolia* L. Tr. RUD: uncommon, with a few individuals planted in area. *Valov 2008063* (HCIB 27629). PINO SALADO; AUSTRALIAN PINE.

Celastraceae

Maytenus phyllanthoides Benth. Sh. CW, SCB-AS, D-R, D-F: widespread; commonly found in transition zones such as between alkali sink or dunes and the adjacent desert scrub, beach bluffs; northern range around Santa Rosalía and San Ignacio. *Daniel 1905* (ASU 0039372); *Dillon 1953* (UCR 29680); *Gander 9612* (UCR29680); *Jones s.n.* (RSA 0017580, Mulegé 1923); *Reeder 7159* (UC 1489440); *Valov 2004079* (HCIB), *2004182* (HCIB 23886); *Wolfson 866* (SD 93715). MANGLE DULCE; SWEET MANGROVE.

Schaefferia cuneifolia A.Gray Sh. SCB, D-R: widespread and common. *Carter 2823* (UC 1560728); *Valov 2004152* (HCIB 22210), *2005016* (HCIB 21470), *1196* (SD 265586). SARAMPIÓN, CAPUL, PANALERO, HIERBA DEL CUERVO; DESERT YAU-PON.

Chenopodiaceae

Allenrolfea occidentalis (S.Watson) Kuntze Sh. CW, SCB-AS, D-R, MG: widespread and common in coastal and inland saline soils; often the only

- perennial species on the drier, inland portions of some coastal mudflats. *Stephenson* 67 330 (SD 94275); *Valov* 2004168 (HCIB 22220); *Wolfson* 872 (SD 93924). CHAMIZO VERDE, CHAMIZO DE AGUA, HIERBA DEL BURRO; IODINE BUSH.
- Arthrocnemum subterminale* (Parish) Standley [In Wiggins as *Salicornia subterminalis* Parish] **Ph.** CW, MG, D: widespread, common; forms rounded mounds that tend to grow along the outer edges of wetlands above the tideline where infrequently inundated. *Valov* 2004087 (HCIB 20605), 2004166 (HCIB), 2005055 (HCIB 24193), 2010063 (SD 208229); *Wolfson* 871 (SD 93632), 877 (SD 93633). SALICORNIA; PARISH PICKLEWEED/GLASSWORT.
- Atriplex barclayana* (Benth.) D.Dietr. subsp. *barclayana* [In Wiggins as *Atriplex barclayana* subsp. *dilatata* (Greene) H.M.Hall & Clem., *Atriplex dilatata* Greene, *Atriplex barclayana* subsp. *palmeri* (S.Watson) H.M.Hall & Clem., *Atriplex barclayana* subsp. *sonorae* (Standl.) H.M.Hall & Clem., *Atriplex sonorae* Standl.] **Ph.** CW, SCB-AS, D: widespread and common in saline soils; highly variable. *Gander* 9611 (SD 29300 & 257946); *Howe* 4012 (SD 60909); *Sanders* 6372 (UCR 42933); *Taylor* 6311 (UC 1731534); *Valov* 2004084 (HCIB 4155), 2004085 (HCIB 23856), 2004184 (HCIB 23888); *Wolfson* 864 (SD 93834). SALADILLO, CENIZO, CHAMIZO, GALLATILLA; SONORAN SALT BUSH.
- Atriplex linearis* S.Watson [In Wiggins as *Atriplex canescens* (Pursh) Nutt. subsp. *linearis* (S.Watson) H.M.Hall & Clem.] **Sh.** D-R, SCB-CB, SCB-AS: widespread but uncommon and sporadic; around El Faro, Punta Prieta and El Equipalito, as well as inland near El Rastro/La Ventana in the Mulegé Valley. *Valov* 2008049 (HCIB 24027), 2010026 (HCIB). CHAMIZO, CHAMIZO SALADO; SLENDER-LEAF SALT BUSH, NARROW-LEAF SHADSCALE.
- Atriplex pacifica* A.Nelson **Ph.** RUD: uncommon; known mainly from mesas along north side of the Mulegé River around habitation or disturbed soils. *Valov* 2004222 (HCIB 23922), 1313 (SD 265588). SALADILLO; SOUTH COAST SALT BUSH, PACIFIC ORACH.
- Atriplex polycarpa* (Torr.) S.Watson **Sh.** *Valov* 2009002. SCB-CB: widespread but uncommon and sporadic. *Valov* 2009002 (SD 192876). CHAMIZO CENIZO; ALL SCALE SALT BUSH, MANY-FRUIT SALT BUSH, CATTLE SPINACH.
- **Atriplex semibaccata* R.Br. **Ph.** RUD: uncommon; known mainly from around habitation in H. Mulegé, but possibly widespread across area in other populated areas. *Valov* 2004150 (HCIB 23877), 2004221 (HCIB 23921). SALADILLO, CACHIYUYO; AUSTRALIAN SALT BUSH, CREEPING SALT BUSH.
- **Bassia hyssopifolia* (Pall.) Kuntze **An.** RUD: known only from one specimen around residence at Playa Santispac. *Valov* 2005071 (HCIB 21428). CHAMIZO PULPO; FIVE-HOOK BASSIA, SMOTHER WEED.
- **Chenopodium murale* L. **An.** RUD, D-R, SCB-AS, RP: widespread, common and abundant, esp. after summer rains; also around habitations and in disturbed soils. *Valov* 2004086 (HCIB), 2005010 (HCIB 23932). EPAZOTE, QUELITE HEDIONDO; NETTLE-LEAF GOOSEFOOT.
- **Dysphania ambrosioides* (L.) Mosyakin & Clemants [In Wiggins as *Chenopodium ambrosioides* L.] **An.** RP, RUD: widely uncommon, but seen more in the Mulegé oasis area where it has spread widely and is visible wherever grazing animals have browsed around it, leaving open spaces. *Valov* 2010060 (SD 208231), 1158 (HCIB), 1194 (SD 260935), 1197 (SD 265593). EPAZOTE; MEXICAN TEA, WORMSEED.
- Salicornia bigelovii* Torr. **An.** CW, MG: widespread and common in estuaries and mudflats within the tidal zone. *Valov* 2004224 (HCIB 23924), 2005095 (HCIB 21449). SALICORNIA; BIGELOW PICKLEWEED, SALT WORT, GLASSWORT.
- Salicornia pacifica* Standl. [In Wiggins as *Salicornia virginica* (misapplied)] **Ph.** CW, MG: widespread and common in salt marshes. *De Groot* (SD 250250); *Valov* 2010062 (SD 208236), 2010064 (SD 2080232), 2010065 (SD 208235), 2010067 (SD 208234), 2010068 (SD 208233). SALICORNIA; PACIFIC PICKLEWEED, PACIFIC SWAMPFIRE.
- Suaeda nigra* (Raf.) J.F.Macbr. [In Wiggins as *Suaeda torreyana* S.Watson var. *torreyana*, *Suaeda torreyana* S.Watson var. *ramosissima* (Standl.) Munz, *Suaeda fruticosa* Forrsk. ex J.F.Gmel. misappl.; syn = *Suaeda moquinii* (Torr.) Greene] **Sh.** CW, SCB-AS, D-R, RUD: widespread, common along margins of salt flats, rear dunes and disturbed, alkaline soils. *Palmer* 13 (UC 116524); *Valov* 2004169 (HCIB 22836); *Wolfson* 875 (SD 93696). QUELITE SALADO, ROMERITO, SOSA; SEA BLITE, BUSH SEEPWEED.

Cleomaceae

- **Arivela viscosa* (L.) Raf. **An.** RUD: rare; known only from roadside near Playa Armenta; seen outside of the study area farther south along Bahía Concepción, uncommon elsewhere. *Valov* 1225 (SD 265594). ASIAN SPIDERFLOWER.
- Wislizenia refracta* Engelm. subsp. *palmeri* (A.Gray) S.Keller [In Wiggins as *Wislizenia refracta* var. *palmeri* (A.Gray) I.M.Johnst., *Wislizenia refracta* var. *mammillata* (Rose ex Greene) I.M.Johnst.] **An.** SCB-WC, RUD: uncommon; several sites in the Mulegé Valley. *Howe* 4010 (SD 60904); *Thomas* 7970 (SD 49988); *Valov* 2004177 (HCIB 23882), 1227 (SD 265596). GUACO; PALMER JACKASS CLOVER.

Coldeniaceae (Luebert et al. 2016)

- Cordia parvifolia* A.DC. **Sh.** SCB, D-R: widespread, common; abundant in washes and alluvial fans. *Baker* 8718 (ASU 0006981); *Charlton* 73 (UCR 42147); *Howe* s.n. (SD 80815, c. Bahía Concepción

1967), 4451 (SD 113292); *Rebman* 2872 (BCMEX 7219), 3350 (SD 139319), 4219 (SD 142455); *Valov* 2006047 (HCIB 22820). VARA PRIETA, DODECANDRA, CHIRICOTE; LITTLE-LEAF CORDIA, SMALL-LEAF GEIGERBUSH.

Combretaceae

Laguncularia racemosa (L.) Gaertn. **Sh, Tr.** MG, CW, D-R: widespread, common; northern limit around the Mulegé area; listed as NOM A. *Clemons* 1399 (SD 119014); *Dice* 576 (SD 117583); *Howe s.n.* (SD 60868, Mulegé estuary 1964); *Knobloch* 2351 (SD 73681); *Moran* 8464 (UC 1235657); *Valov* 2005096 (HCIB 21450); *Wolfson* 873 (SD 93757). MANGLE BLANCO; WHITE MANGROVE.

Convolvulaceae

Cressa truxillensis Kunth **Ph.** CW, D-R, SCB-AF: widespread; common mostly along the Mulegé estuary; many of the plants have the inferior surface of their leaves heavily covered with pustules of a bright orange rust (*Puccinia tuyutensis*, Pucciniaceae). *Valov* 2005044 (HCIB 21487). SPREADING ALKALI WEED.

Cuscuta corymbosa Ruiz & Pav. var. *grandiflora* Engelm. [In Wiggins as *Cuscuta corymbosa* (no varieties)] **An, Pa.** SCB-CB: uncommon; known from Islas Blanca and Coyote, not observed on adjacent mainland. *Valov* 1243 (HCIB); *Wiggins* 17403 (SD 94548). CABELLO DE ÁNGEL; LARGE-FLOWER DODDER.

Cuscuta legitima Costea & Stefanović [In Wiggins as *Cuscuta umbellata* Kunth var. *reflexa* (J.M.Coulter) Yunck] **An, Pa.** SCB: common, widespread; found on *Euphorbia polycarpa* (Benth.) Millsp., *Boerhavia xantii* S.Watson, and *Amaranthus watsonii* in this area. *Valov* 2003014 (HCIB 20080), 2003015 (HCIB 20081), 2003025 (HCIB 20090), 2004204 (HCIB 22839). CHUPONES, FIDEO; REFLEXED FLAT-GLOBE DODDER.

Cuscuta tuberculata Brandegee **An, Pa.** SCB: found on *Bajacalia crassifolia*, *Boerhavia xantii*, and *Allionia incarnata* (Standl.) Munz. *Domínguez León* 530 (SD 157788); *Valov* 2009062 (HCIB). CHUPONES, FIDEO; TUBERCLE DODDER.

Evolvulus alsinoides (L.) L. Torr. [In Wiggins as *Evolvulus alsinoides* L. var. *acapulcensis* (Willd.) Ooststr.] **Ph.** SCB-RH: uncommon; known only from Mulegé Valley. Observed in mountains to west. *Valov* 1212 (SD 265600). OREJA DE RATÓN; MOUSE EARS, SLENDER DWARF MORNING-GLORY.

§ *Ipomoea hederacea* Jacq. **An, Vi.** SCB-WC: uncommon, occasional. Original observation made prior to the beginning of the study period, but it was not found again during the study period. *Valov* personal observation (Playa Punta Arena, Nov. 2003. <https://www.inaturalist.org/observations/38050673>). MANTO, CAMPANILLA,

TROMPILLO MORADO, CORREHUELA ANUAL; IVY-LEAF MORNING-GLORY.

Ipomoea pes-caprae (L.) R. Br. subsp. *brasiliensis* (L.) Ooststr. **Ph, Vi.** RUD: native species common around the Cape Region but appears to be an ornamental here where it is mostly planted in saline soils near the coast. *Valov* 1241 (HCIB). TRIPA DE AURA; BEACH MORNING-GLORY, SEAGRAPE.

Ipomoea ternifolia Cav. var. *leptotoma* (Torr.) J.A.McDonald [In Wiggins as *Ipomoea leptotoma* Torr.] **Ph, Vi.** SCB-WC, SCB-RH: uncommon, occurring occasionally after floods in the Mulegé Valley and along Bahía Concepción. *Valov* 2010066 (SD 208237). TROMPILLO, MANTO; TRIPLE-LEAF MORNING-GLORY.

Ipomoea triloba* L. **Ph, Vi, Hf. RP: common and abundant only in the Mulegé oasis where it has become well-established since the 2009 flood, and where it vigorously covers the ground, shrubs and climbs into the trees; a few small populations also noted downhill from inhabited areas along a few small washes near Punta Prieta. *Valov* 1117 (SD 265601). MANTO, TROMPILLO; LITTLE BELL.

Jacquemontia eastwoodiana I.M.Johnst. [In Wiggins as *Jacquemontia abutiloides* Benth. var. *eastwoodiana* (I.M.Johnst.) Wiggins] **Sh, Subsh, Vi.** SCB: widespread, common and often abundant, flowering profusely after summer rains; BCS endemic, ranging from near Santa Rosalía to La Paz and on several adjacent Gulf islands. *Rebman* 3353 (SD 139296); *Valov* 2003074 (HCIB 20132), 2004201 (HCIB 23903). MANTO DE LA VIRGEN; EASTWOOD CLUSTERVINE, GULF CLUSTERVINE.

Merremia dissecta (Jacq.) Hallier f. **Ph, Vi, Hf.** RUD: commonly seen as garden ornamental around H. Mulegé, but as of 2009 flood, it also appears to be growing wild in the Mulegé oasis; known mainly from the Sierra de la Giganta (upstream from town). *Valov* 1206 (SD 265603). CORREHUELA DE LAS DOCE; NOYAU VINE, ALAMO VINE.

Cucurbitaceae

Brandegea bigelovii (S.Watson) Cogn. **Ph, Vi.** SCB-WC, RP: known mainly from the Mulegé Valley and oasis; does not seem to co-occur with *Vaseyanthus* or *Echinopepon*, nor occur elsewhere in the area. *Daniel* 2398 (ASU 0042050); *Valov* 2010023 (SD 208238). DESERT STARVINE.

Cucumis dipsaceus* Ehrenb. ex Spach **An, Vi. RP: known only from one plant in Mulegé oasis. *Valov* 1323 (SD 265605). MELÓN DE COYOTE, FULITO, MELONCITO; HEDGEHOG GOURD.

Cucurbita cordata S.Watson **Ph, Vi.** *Valov* 2009064. SCB-WC: widespread, common and often very abundant after heavy summer rains; LC endemic. *Valov* 2009064 (HCIB). CALABACITA, CALABAZA AMARGA, CALABACILLA DE COYOTE; BAJA CALIFORNIA (COYOTE) MELON.

Echinopepon minimus (Kellogg) S.Watson var. *peninsularis* (Gentry) Stocking [In Wiggins as *Echinopepon peninsularis* Gentry] **An, Vi.** SCB-WC, D-R: almost exclusively seen along Bahía Concepción or the immediate Gulf coast; unable to find within the Mulegé basin in 2007-19; BCS endemic. *Daniel* 1899 (ASU 0042131), 926 (ASU 0042127); *Valov* 2004016 (HCIB), 2004035 (HCIB 1623), 2004036 (HCIB), 2005056 (HCIB 21502); *Zippin* 66 (SD 132202). HUIZAPOL; PENINSULAR BALSAM-APPLE.

Ibervillea sonora (S.Watson) E.Greene [In Wiggins as *Ibervillea sonora* var. *peninsularis* (I.M.Johnst.) Wiggins, *Ibervillea insularis* (Brandeggee) Wiggins] **Ph, Vi.** SCB, D-R. *Valov* 2004167 (HCIB 23880), 2006046 (HCIB 22819). CALABACITA DE COYOTE; COYOTE MELON.

Momordica balsamina* L. **An, Vi. RUD: rare in BCS; known on the peninsula only from these two collections from fence rows in both the oasis and downtown area of H. Mulegé. *Valov* 2004188 (HCIB 23892), 1325 (SD 265606). SOUTHERN BALSAM-PEAR.

Vaseyanthus insularis (S.Watson) Rose [In Wiggins as *Vaseyanthus insularis* var. *inermis* I.M.Johnst., *V. i.* var. *palmeri* (S.Watson) Gentry, *Vaseyanthus rosei* Cogn.] **Ph, Vi.** This was previously recognized in Wiggins (1980) as two varieties, differing primarily in fruit characteristics and with minor differences in leaf shape. Along Bahía Concepción, they can be found growing together and commonly even intertwined, yet it appears that individual plants will have one of two types of fruit, one covered densely with prickles < 1 cm L, and the other mostly smooth with a few rudimentary prickles. Leaves of both are highly variable from plant to plant and with age in same plant, but lobes of older leaves generally apiculate. SCB, D-R: widespread, common close to the coast; appears to be lacking in the Mulegé basin. *Valov* 2003011 (HCIB 20077), 2003012 (HCIB 20078), 2003041 (HCIB 20105), 2003042 (HCIB 20106), 2004014 (HCIB 20148), 2004015 (HCIB 20149), 2004163 (HCIB 22835), 1322 (SD 265607); *Webster* 19604 (SD 109083). HUIZAPOL; GULF VASEYANTHUS, BALSAM-APPLE.

Ehretiaceae (Luebert et al. 2016)

§ *Bourreria sonora* S.Watson **Sh.** SCB-WC: uncommon; BCS near endemic. Valov personal observation, 2005 (<https://www.inaturalist.org/observations/38049854>). First observed and identified in 2005 in vegetated arroyo bed at the southern limit of the study area near Playa la Armenta. The arroyo was stripped bare in a 2012 flash flood but it is likely that the species occurs upstream. In 2018 it was seen in an arroyo west of Colonia Vista al Mar, just beyond the limits (buffer zone) of the study area, at about 50 meters elevation. LENGUA DE GATO, CHOCOLATILLO.

Tiquilia canescens (DC.) A.T.Richardson var. *canescens* [In Wiggins as *Coldenia canescens* DC.] **Sh.** SCB-GYP: Punta Chivato. SCB-AF: near Playa Santa Inés. Uncommon over entire area, but where it occurs there are moderate-sized populations. *León de la Luz* 09-89 (HCIB 24372); *Valov* 2009005 (SD 192867). WOODY CRINKLEMAT, SHRUBBY COLDENIA.

Tiquilia cuspidata (I.M.Johnst.) A.T.Richardson [In Wiggins as *Coldenia cuspidata* I.M.Johnst.] **Ph.** D-F, D-R, SCB-WC: most common in loose, sandy or silty inland and coastal soils or on old marine terraces. *Carter* 2825 (UC1095106), *León de la Luz* 09-89 (SD 222420); *Valov* 2003070 (HCIB 20128), 2003084 (HCIB 20141), 1080 (HCIB). CRINKLEMAT.

Euphorbiaceae

Acalypha saxicola Wiggins **Sh.** SCB-RH: restricted to rocky hillsides along Bahía Concepción; local endemic. *Daniel* 1900 (ASU 0026710), 2391 (ASU 0026709); *Hodgson* 3087 (ASU 0026708); *Moran* 8463 (SD 54497); *Moran* 9048 (SD 66727); *Rebman* 6093 (SD 145939); *Sanders* 6388 (SD 43187); *Shreve* 7092 (SD 731736); *Valov* 2003027 (HCIB 20092), 2004217 (HCIB 23917). HIERBA DE CÁNCER; BAHÍA CONCEPCIÓN COPPERLEAF.

Adelia brandegeei V.W.Steinm. [In Wiggins as *Adelia virgata* Brandeggee] **Sh.** SCB: widespread but uncommon and sporadic. *Valov* 1074 (SD 260943). PIMENTILLA; BRANDEGEE FALSE-OCOTILLO, WILD LIME.

Cnidoscolus palmeri (S.Watson) Rose **Subsh.** SCB-RH: uncommon, not observed during study period. *Moran* 9049 (SD 66759). This specimen is within the study zone but above the altitude limit. It is a common plant in mountains to west of town starting at about 150 meters. ORTIGUILLA, MALA MUJER, ZAMAQUE VENENOSO, CARIBE; PALMER ROCK NETTLE, STINGING SPURGE.

Croton californicus Müll. Arg. [In Wiggins as *Croton californicus* var. *californicus*, *Croton californicus* var. *tenuis* (S.Watson) Ferg.] **Ph.** D-F, D-R: widespread, occasional; absent on beaches around Bahía Concepción with high human impact. *Valov* 2006058 (HCIB 22831), 2005059 (HCIB 22832), 2005106 (HCIB 21456). HIERBA DEL PESCADO, VARA BLANCA; CALIFORNIA CROTON.

Ditaxis brandegeei (Millsp.) Rose & Standl. var. *brandegeei* **Ph.** SCB, RUD: widespread, common; BCS endemic; found from around Santa Rosalía to Loreto and on some adjacent Gulf islands. *Baker* 8719 (ASU 0027259); *Chambers* 786 (SD 46851); *Daniel* 2387 (ASU 0027261); *Gallagher* 255 (ASU 0027270); *Sanders* 6389 (SD 43188); *Shreve s.n.* (ARIZ 69692, Boca de Magdalena N of Mulegé 1935); *Valov* 2004025 (HCIB 13159), 2004213 (HCIB 13159), 1232 (SD 265614); *Van Devender* 91-462 (ASU 0027263). BRANDEGEE SILVERBUSH.

Ditaxis brandegeei (Millsp.) Rose & Standl. var. *intonsa* I.M.Johnst. **Ph.** SCB: sporadic, known from H. Mulegé and around Bahía Concepción; this variety differs from var. *brandegeei* in that it has densely hairy fruit; ranges from around Mulegé to Loreto and on some adjacent Gulf islands. *Valov* 2005192 (HCIB 23191), 1230 (SD 265615). SONORAN SILVERBUSH.

Ditaxis lanceolata (Benth.) Pax & K.Hoffm. **Ph.** SCB: widespread, common. *Sanders* 6385-B (UCR 43150); *Shreve s.n.* (ARIZ 69692, Bahía Concepción 1935); *Valov* 2004071 (HCIB 20607), 2004162 (HCIB 22217). NARROWLEAF SILVERBUSH.

Ditaxis neomexicana (Müll. Arg.) Heller. **An.** SCB: widespread, sporadic. *Valov* 2003057 (HCIB 20118), 2005091 (HCIB 23951), 205125 (HCIB 21455). COMMON SILVERBUSH.

Ditaxis serrata (Torr.) A.Heller var. *serrata* **Ph.** D-F, D-R: widespread, sporadic on less disturbed dunes; lacking on beaches along Bahía Concepción with high human impact. Plants in area with mostly entire margins beneath dense pubescence. According to Felger (2000), the plants from Baja California Sur (as well as from some Gulf islands) may represent a different taxon with their pointed leaves (p. 273). *Valov* 2005105 (HCIB), 2008048 (SD 192882), 2008052 (HCIB), 2009051 (HCIB 27636). SAWTOOTH DITAXIS, YUMA SILVERBUSH.

Euphorbia capitellata Engelm. [syn = *Chamaesyce capitellata* (Engelm.) Millsp.] **Ph.** Not found during this study. **RUD.** *Gander* 9627 (SD 29317). GOLONDRINA; HEAD SANDMAT.

Euphorbia ceroderma I.M.Johnst. **Sh. Sc.** SCB-GYP, SCB-RH: known only from the Punta Chivato area where abundant, mostly on old marine soils; disjunct populations elsewhere on western peninsula between Laguna San Ignacio and Bahía Magdalena. Better known from Sonora. Listed in CITES Appendix II. *Valov* 2005109 (HCIB), 2010051 (SD 208239). JUNCO, ESPADÍN, CANDELILLO; WAX SPURGE.

Euphorbia eriantha Benth. **An.** SCB, **RUD:** widespread species, often abundant in open spaces and roadsides after summer rains. *McLaughlin s.n.* (ARIZ 215612, 4.8 mi N of Mulegé 1979); *R. Perrill s.n.* (ARIZ 284858, south of Mulegé 1983); *Roberts s.n.* (SD 182707, c. San Bruno 2007); *Valov* 2003071 (HCIB 20129); *Zippin* 2 (SD 130889). GOLONDRINA; BEETLE SPURGE, DESERT POINT-SETTA.

Euphorbia graminea* Jacq. **An. **RUD:** weedy species found in a H. Mulegé garden beneath a mango tree in the watering ditch. *Valov* 1346 (SD 265611). GRASS-LEAF SPURGE.

Euphorbia hirta L. var. *hirta* [syn = *Chamaesyce hirta* L.] **An.** **RUD:** rare; in planter strips filled with soil from the Mulegé Valley; known from beyond the study area in the Sierra Guadalupe (west of town) and the Cape region. *Valov* 2005009 (HCIB 21498). HIERBA DE PALOMA; PILL-POD SANDMAT.

Euphorbia lomelii V.W.Steinm. [In Wiggins as *Pedilanthus macrocarpus* Benth.] **Sh, Sc.** SCB: widespread, common. Listed in CITES Appendix II. *Valov* 2004175 (HCIB), 2004193 (HCIB 23895), 2004194 (HCIB 23896). CANDELILLA; SLIPPER PLANT, WAX PLANT.

Euphorbia magdalenae Benth. **Sh.** SCB: widespread; most common in arroyos and rocky hillsides where it is abundant; often replaced by *E. tomentulosa* on upper hillsides along Bahía Concepción; LC near endemic occurring mostly in BCS. *Baker* 8721 (ASU 0030714); *Daniel* 2384 (ASU 0030717); *de Groot* 4881 (SD 250261); *Rebman* 3352 (SD 139280), 4226 (SD 142434); *Valov* 2004034 (HCIB), 2004061 (HCIB), 2004118 (HCIB 23868), 2006054 (HCIB 22827). GOLONDRINÓN, GOLONDRINA; MAGDALENA ISLAND SPURGE.

Euphorbia pediculifera Engelm. var. *pediculifera* [In Wiggins as *Euphorbia taluticola* Wiggins; syn = *Chamaesyce pediculifera* (Engelm.) Rose & Standl.] **Ph.** SCB: widespread, common. *McLaughlin* (ARIZ 215720, 4 mi. N of Mulegé 1979); *Valov* 2003003 (HCIB), 2004067 (HCIB 23904), 2004202 (HCIB 20602). GOLONDRINA; LOUSE SPURGE.

Euphorbia polycarpa (Benth.) Millsp. var. *polycarpa* [In Wiggins as *Euphorbia polycarpa* Benth; syn = *Chamaesyce polycarpa* (Benth.) Millsp. var. *polycarpa*, *Chamaesyce polycarpa* (Benth.) Millsp. var. *hirtella* (Boiss.) Millsp. ex Parish, *Euphorbia intermixta* S.Watson, *Euphorbia polycarpa* var. *intermixta* (S.Watson) L.C.Wheeler] **An.** SCB, **D:** widespread and most common sand mat in the area, found in a variety of habitats and soils; often occurring alongside less common *E. setiloba* in fine soils. *Carter* 1982 (UC 1560453); *Carter* 2824 (UC 1560453); *Sanders* 6386 (UCR 42922); *Valov* 2003052 (HCIB 20114), 2003053 (HCIB 20115), 2004078 (HCIB), 2004185 (HCIB 22837). GOLONDRINA; SMALL-SEED SANDMAT.

Euphorbia serpens* Kunth [syn = *Chamaesyce serpens* (Kunth) Small] **An. **RUD:** rare, known only from H. Mulegé around habitation. *Valov* 2005080 (HCIB 21435). GOLONDRINA; CREEPING SPURGE.

Euphorbia setiloba Engelm. ex Torr. [syn = *Chamaesyce setiloba* (Torr.) Millsp. ex Parish] **An.** SCB: widespread, common; most often found in loose, fine soils such as water courses, alongside *E. polycarpa* var. *polycarpa*. *Valov* 2004159 (HCIB 22216). GOLONDRINA; FRINGED SPURGE, BRISTLE-LOBED SANDMAT.

Euphorbia tomentulosa S.Watson [syn = *Chamaesyce tomentulosa* (S.Watson) Millsp.] **Sh.** SCB-RH: widespread, somewhat common; often replacing *E. magdalenae* on upper slopes, and rarely reaching downslope on bajadas. *McLaughlin s.n.* (ARIZ 215957, 4.8 mi N of Mulegé 1979); *Valov* 2004040 (HCIB), 2004158 (HCIB 22215), 2005061 (HCIB 21495). RAÍZ COLORADO, LIGA; SHRUBBY SANDMAT.

Euphorbia xanti Engelm. **Sh.** **Sc.** SCB-WC, D-R: widespread, fairly common, especially near the coast in fine, loose soils. Listed in CITES Appendix II. *De Groot* 4883 (SD 250268); *Valov* 2004054 (HCIB), 2004124 (HCIB 23871). LIGA, JUMETÓN, PATA DE AURA, SEÑORITA; BAJA CALIFORNIA SPURGE.

Jatropha cinerea (Ortega) Müll. Arg. **Sh.** SCB, D: widespread and extremely common; a dominant shrub especially in fine, loose soils. *Valov* 2009049 (HCIB 27634). LOMBOI, SANGRENGADO, SANGRE DE DRAGO; ASHY LIMBERBUSH.

Jatropha cuneata Wiggins & R.C. Rollins **Sh.** SCB, D-R: widespread; a dominant and ubiquitous shrub of many habitats and soils, but in this area especially in heavier, packed soils. *Valov* 2009050 (HCIB 27635). MATA CORA, SANGRENGADO; (DESERT) LIMBERBUSH, LEATHERPLANT.

Pleradenaphora bilocularis (S. Watson) Esser & A.L. Melo [In Wiggins as *Sapium biloculare* (S. Watson) Pax; syn = *Sebastiania bilocularis* S. Watson] **Sh.** SCB-WC: uncommon, sporadic on alluvial soils of the Mulegé Valley and Boca de Magdalena. *Porter* 13837 (BCMEX 12612); *Valov* 2010059 (SD 208240). YERBA DE LA FLECHA; ARROW POISON PLANT, JUMPING BEAN BUSH.

Ricinis communis* L. **An. RP, RUD, SCB-WC: widespread, occasional weedy species; in the Mulegé oasis on river banks, growing within *Arundo donax* where it can reach 5 m high. *Valov* 2010007 (HCIB). HIGUERILLA; CASTOR BEAN.

Fabaceae (Leguminosae)

Aeschynomene nivea Brandegees **Ph.** **Sh.** SCB-WC, SCB-RH, SCB-GYP: common, widespread; LC endemic. *Baker* 8724 (ASU 0022360); *Gander* 9631 (SD 29321); *Rebman* 4222 (SD 142426); *Valov* 2003008 (HCIB 20074), 2003073 (HCIB 20131), 2004108 (HCIB 23863); *Van Devender* 91-453 (ASU 0010799). VARA PRIETA, GUAJO; BAJA CALIFORNIA JOINTVETCH.

Albizia lebbek* (L.) Benth. **Tr. RUD: widespread, common, planted around most towns. *Jones s.n.* (ARIZ 180160, Hotel Hacienda garden 1971). ACACIA; RATTLEPOD, SIRIS TREE.

Brongniartia peninsularis Rose **Sh.** SCB-WC, SCB-RH: widespread but sporadic; local endemic from around Mulegé and Bahía Concepción; known also from Sierra Guadalupe to west of town. *Burgess* 6130 (ARIZ 235963); *Burgess* 6139 (ARIZ 232666); *Holler s.n.* (DES 00024039, Bahía Concepción 1982); *Rebman* 4214 (SD 142411); *Shreve* 7083 (ARIZ 2417); *Turner* 64-399 (ARIZ 159300); *Valov* 2004154 (HCIB 22212). GARABATILLO; PENINSULAR GREENTWIG.

Caesalpinia pannosa Brandegees Taxonomy follows Lewis (1995). [In Wiggins and Rebman et al. (2016) as *Caesalpinia arenosa* Wiggins, *Caesalpinia pannosa* Brandegees] **Sh.** SCB-GYP, SCB-WC: uncommon, known from the Mulegé basin and

Playa Santa Inés area; more common south of Bahía Concepción; BCS endemic. *Valov* 2010053 (SD 208247). TABACHÍN, VARA PRIETA, PALO ESTACA, FRIJOLILLO, GALLINITA; PENINSULAR CAESALPINIA.

Calliandra californica Benth. **Sh.** SCB-WC, D-R: widespread, sporadic. *Valov* 2009076 (HCIB). TABARDILLO, TABACHÍN, CABELLO DE ÁNGEL; RED FAIRYDUSTER.

Dalea mollis Benth. [In Wiggins as *Dalea mollis* Benth. subsp. *mollis*, *Dalea mollis* subsp. *pilosa* (Rydb.) Wiggins] **An.** SCB-AF, SCB-CB: widespread, common; an abundant ground cover of open ground, especially after summer rains and near the coast. *Wiggins* 5457 (UC 660700); *Valov* 2004004 (HCIB 2828), 2005050 (HCIB 21490). HAIRY PRAIRIE CLOVER, SILKY DALEA.

*§ *Delonix regia* (Bojer ex Hook.) Raf. **Tr.** RUD: occasional ornamental in H. Mulegé. *Valov* personal observation (central H. Mulegé, 2003. <https://www.inaturalist.org/observations/38050370>). ÁRBOL DE FUEGO, FLAMBOYÁN; ROYAL POINCIANA, FLAMBOYANT, FLAME TREE.

Desmanthus covillei (Britton & Rose) Wiggins ex B.L. Turner **Sh.** RP: rare, known only from two sites: 4–5 plants in an abandoned orchard in the oasis near the Mulegé bridge that appeared in 2012 after a flood and persisted at least through 2015; and 2–4 plants found in early 2019 on the grounds of the Mission high above the first site, growing between paving stones. *Valov* 1136 (SD 260947), 1217 (SD 265622). FRIJOLILLO, FRUTILLO; COVILLE BUNDLEFLOWER.

Desmanthus fruticosus Rose **Sh.** SCB-RH, SCB-WC, RUD: widespread, common and often an abundant weed of disturbed soils of highway margins; LC near endemic. *Gentry* 4069 (ARIZ 3279); *Hodgson* 3111 (ASU 0021238); *Valov* 2005086 (HCIB 21441). DAÍ, FRIJOLILLO; BAJA CALIFORNIA BUNDLEFLOWER.

Ebenopsis confinis (Standl.) Barneby & J.W. Grimes [In Wiggins as *Pithecellobium confine* Standl.] **Sh.** SCB, D-R: widespread, common and often abundant, esp. between San Bruno and Mulegé; LC near endemic. *Van Devender* 91-442 (ARIZ 291454); *Valov* 2010045 (SD 208249), 2010047 (SD 208248). EJOTÓN, PALO FIERRO; DOG POOP BUSH.

Hoffmannseggia intricata Brandegees **Sh.** SCB-AF, SCB-RH: widespread, common, often very abundant; LC near endemic, southern range around Bahía Concepción. *Gander* 9635 (SD 29325); *Howe* 4455 (SD 113537); *Hodgson* 3107 (ASU 0022217); *León de la Luz* 09-88 (HCIB 24301); *Pinkava* 2241 (ASU 0077949); *Rebman* 4227 (SD 142422); *Sanders* 6381 (UCR 43149); *Valov* 2004095 (HCIB 23858), 2004122 (HCIB 4288); *Van Devender* 91-4411 (ARIZ 291450). GULF RUSH-PEA.

Leucaena leucocephala* (Lam.) de Wit subsp. *leucocephala* [syn = *Leucaena glauca* (L.) Benth.] **Tr. RUD, RP: widespread, common; planted as

- ornamental but easily escapes and naturalizes in areas surrounding habitation. *Valov* 2005082 (HCIB 21437). GUAJE, GUAJILLO; WHITE LEAD-TREE.
- Lupinus arizonicus* (S.Watson) S.Watson [In Wiggins as *Lupinus sparsiflorus* Benth. var. *barbatulus* Thornber, *Lupinus sparsiflorus* Benth. var. *insignatus* C.P.Sm.] **An.** SCB-WC, RUD: rare and sporadic along highway margins from around Palo Verde and northward towards Santa Rosalía (in the outwash area of Arroyo San José de Magdalena). *Valov* 1079 (HCIB 27597), 1309 (SD 265624). TRÉBOLA, LUPINO; ARIZONA LUPINE.
- Lysiloma candidum* Brandegees [In Wiggins as *Lysiloma candida*, a spelling variant of epithet] **Tr.** LC near endemic. SCB-WC, SCB-RH, SCB-AF: widespread and common. *Valov* 2010050 (SD 208251). *Haughey* 254 (DES 00018391); *Johnson* 88-75 (NY 550141); *Valov* 2004107 (HCIB 22752), 2005094 (HCIB 21448). PALO BLANCO.
- Macroptilium atropurpureum* (DC.) Urb. [In Wiggins as *Phaseolus atropurpureus* DC., *Phaseolus atropurpureus* var. *sericeus* A.Gray] **Ph, Vi.** RP, RUD: rare, known only from a few plants in the Mulegé oasis. *Valov* 2010050 (SD 208251). FRIJOLITO, PURPLE BUSH BEAN.
- Marina parryi* (A.Gray) Barneby [In Wiggins as *Dalea parryi* Torr. & A.Gray ex A.Gray] **Ph.** Includes *Valov* 2004205 with white flowers. SCB: widespread, common and abundant; commonly forms dense ground cover on bajadas, each plant with tangled dry stems persisting from previous seasons filling in open spaces between larger shrubs. *Gander* 9633 (SD 29323); *Valov* 2003034 (HCIB 20098), 2003038 (HCIB 20102), 2003063 (HCIB 20123), 2004205 (HCIB 23906), 2004210 (HCIB 23910). CASA DE INDIO; PARRY DYE-WEED, PARRY'S FALSE PRAIRIE CLOVER, PARRY'S INDIGOBUSH.
- Marina peninsularis* (Rose) Barneby [In Wiggins as *Dalea peninsularis* (Rose) Bullock] **An.** R-D: known only from inland dune areas on northern side of Punta Chivato where it can be abundant ground cover after summer rains. *Valov* 2010055 (SD 208250). PENINSULAR MARINA.
- Marina vetula* (Brandegee) Barneby [In Wiggins as *Dalea vetula* Brandegees] **An.** SCB-RH, SCB-CB: Widespread but uncommon, known from several different sites along Bahía Concepción, including Isla Coyote, and hillsides around H. Mulegé. More common in the mountains to the west. *Moran* 9035 (SD 59435); *Valov* 1090 (HCIB 27607); *Wiggins* 17985 (SD 508795). GIGANTA MARINA.
- **Medicago sativa* L. **An.** RUD: Occasional agricultural escape, growing alongside roads. *Valov* 2005067 (HCIB 22219). ALFALFA; ALFALFA.
- **Melilotus indicus* (L.) All. [In Wiggins as *Melilotus indica*, a spelling variant of epithet] **An.** RUD: common weed around habitation. *Valov* 2005003 (HCIB 21462), 2005077 (HCIB 21433). TRÉBOL, TRÉBOL ÁGRIO; YELLOW SWEETCLOVER.
- Mimosa distachya* Cav. var. *distachya* [In Wiggins as *Mimosa purpurascens* B.L.Rob., *Mimosa brandegeei* B.L.Rob.] **Ph.** SCB. Found at edges of Mulegé Valley in the sierra foothills, mainly at, and above, 160–170 m. It becomes more common, abundant and robust beginning at 200 m. Lower elevation plants sparse, small, with very small leaves. *Valov* 1375 (SD), 1376 (SD). GATUÑA, GARABATILLO, UÑA DE GATO; MEXICAN MIMOSA, ARIZONA MIMOSA.
- Olneya tesota* A.Gray **Tr.** SCB: widespread, common, esp. abundant along watercourses and bajadas. Listed as NOM Pr, NT A2d. *Valov* 2005112 (HCIB 22190), 2005113 (HCIB 22191), 2005123 (HCIB 22199). UÑA DE GATO, PALO FIERRO; DESERT IRONWOOD.
- **Parkinsonia aculeata* L. **Tr.** RP, RUD: widespread in the area in populated areas, where it grows along the Mulegé River and oasis, around habitations and along roadsides. According to Rebman et al. (2016), this species may be native to the desert areas of the peninsula, but because it is planted and readily naturalizes, it is likely to have been introduced; it is presumed to be native to SON, SIN, AZ and TX. *Valov* 2005074 (HCIB 21431), 2005087 (HCIB 21442), 2005194 (HCIB 23190). JUNCO, JUNCO MARINO; MEXICAN PALO VERDE, JERUSALEM THORN.
- Parkinsonia florida* (A.Gray) S.Watson [In Wiggins as *Cercidium floridum* Benth. ex A.Gray subsp. *peninsulare* (Rose) A.M.Carter] **Tr.** SCB-CB, SCB-RH: Uncommon in area. The first known collection was from a rocky headland and coastal strand in San Bruno in 1963; in 2015 a group of three trees was finally located in the Mulegé arroyo; and in 2018 another small group was found along the highway near the El Gallito dunes; common and abundant in the Mulegé Valley and adjacent Sierra Guadalupe to the west from around 200 meters elev. and as well as at lower elevations south of Bahía Concepción. *Reese* 4537 (UC 1412371); *Valov* 1278 (SD 265626), 1345 (SD 265625). PALO VERDE; BLUE PALO VERDE, PENINSULAR PALO VERDE.
- Parkinsonia microphylla* Torr. [In Wiggins as *Cercidium microphyllum* (Torr.) Rose & I.M.Johnst.] **Tr.** SCB, D-R: widespread, common and abundant. *De Groot* 4882 (SD 250292); *Valov* 2004125 (HCIB 22624), 2004173 (HCIB 22222), 2005111 (HCIB 22189). DIPÚA, MEDESÁ; LITTLELEAF PALO VERDE.
- Parkinsonia* × *sonorae* (Rose & I.M.Johnst.) R.S.Felger & T.R.VanDevender [In Wiggins as *Cercidium* × *sonorae* Rose & I.M.Johnst.] **Tr.** SCB: This very rare, naturally occurring interspecific hybrid (between *P. microphylla* and *P. praecox*) is currently known from just one tree along the bottom of a narrow canyon on the north side of the river. No specimens of *P. praecox* have been located in the area, but it does occur in and around the Mulegé Valley at around 200 m elevation and

- above, and may occur further upstream or upslope from this tree in the Sierra Azteca. *Valov* 1279 (SD 265628). PALO ESTRIBO; HYBRID PALO VERDE.
- Phaseolus filiformis* Benth. **An, Ph, Vi.** SCB, RUD: widespread, common and abundant, especially after summer rains. *Daniel* 1923 (ASU 0024511), 2378 (ASU 0024524), 2388 (ASU 0024525); *Gander* 9629 (SD 29319); *L. Roberts s.n.* (SD18272, c. San Bruno 2007); *Valov* 2004056 (HCIB), 2004058 (HCIB), 2004156 (HCIB), 2005012 (HCIB 23934). FRIJOLITO; SLIM-JIM BEAN.
- Pithecellobium dulce* (Roxb.) Benth. **Tr.** RUD: planted as ornamental but naturalizes within the Mulegé oasis; native to the peninsula's Cape Region, SON and SIN. *Valov* 2005120 (HCIB 22197). GUAMÚCHIL; MONKEYPOD, MANILA TAMARIND.
- Prosopis articulata* S.Watson **Tr.** SCB, D-R: widespread, common and highly variable across the study area. This species may intergrade with *P. glandulosa* var. *torreyana* in this area, which might account for the variety of specimens that range anywhere from shrub-like with multiple stems to towering, thick-trunked trees 6-8 m H. Flowers are generally clear yellow, not appearing orange. Leaves from different parts of the same plant can key to both species. Fruit tend to be regularly constricted but may vary from slightly wavy to strongly constricted. Mesocarp is thin. Bark is gray above, gray to black below. Season, moisture content and substrate may account for any of these differences. *Sanders* 6384 (UCR 43156), *Valov* 2004133 (HCIB 4446), 2004176 (HCIB), 2005117 (HCIB 22194), 2010057 (SD 208252), 2010058 (SD 208253). MESQUITE AMARGO; BITTER MESQUITE.
- Prosopis palmeri* S.Watson **Tr.** SCB-RH, SCB-AF: Sierra Azteca on grade north out of H. Mulegé (about 150 m elevation) and southward from around Playa Buenaventura at <50 m elevation); BCS endemic. *Palmer* 2 (NY 552029); *Valov* 2009056 (HCIB 27641). PALO FIERRO, PALO HIERRO, MEZQUITE AMARGO; PALMER MESQUITE.
- Psorothamnus emoryi* (A.Gray) Rydb. var. *arenarius* (Brandeggee) Barneby [In Wiggins as *Dalea tinctoria* Brandeggee var. *tinctoria*, *Dalea tinctoria* var. *arenaria* Brandeggee] **Sh.** SCB-RUD: known only from roadside collections starting north of Las Plumas grade (heading north out of H. Mulegé) to beyond San Bruno; not found in adjacent scrub or on beaches or inland dunes. BCS endemic. *Boyd* 5966 (NY 01343899); *Roberts s.n.* (SD 182725, c. San Bruno 2007); *Valov* 1169 (SD 260950), 2003066 (HCIB), 2003067 (HCIB), 2003068 (HCIB). BAJA CALIFORNIA DYE BUSH.
- Psorothamnus emoryi* (A.Gray) Rydb. var. *emoryi* [In Wiggins as *Dalea emoryi* A.Gray, *Dalea juncea* (Rydb.) Wiggins] **Sh.** D-F, D-R: widespread in study area where it is known only from beach dunes; known southern limit is around Bahía Concepción. *Johnson* 1265 (NY 01343919); *Spellenberg* 3336 (NMC 43966); *Valov* 2004127 (HCIB 22623), 2008050 (HCIB 24028), 1170 (SD 260951). DYEBUSH, WHITE DALEA.
- Rhynchosia precatoria* (Humb. & Bonpl. ex Willd.) DC. **Ph, Vi.** RP, RUD: rare, known only currently from a few spindly plants in the Mulegé oasis. *Howe* 4009 (SD 60906); *Valov* 1028 (HCIB). OJITO DE PÁJARO; ROSARY SNOUTBEAN.
- Senegalia peninsularis* Britton & Rose [In Wiggins as *Acacia peninsularis* (Britton & Rose) Standl.] **Sh.** SCB-WC: known mainly from Mulegé Valley where it is sporadic; BCS endemic. *Valov* 2010046 (SD 208243), 2010056 (SD 208244). PALO CHINO, HUIZACHE, TESO, GUAMUCHILILLO; PENINSULAR ACACIA.
- Senna confinis* (Greene) H.S.Irwin & Barneby [In Wiggins as *Cassia confinis* Greene] **Ph.** SCB, RUD: widespread, common; LC near endemic. *Daniel* 2394 (ASU 0028841); *Hodgson* 3102 (DES 00027409); *Rebman* 4212 (SD 14211); *Valov* 2004091 (HCIB 18046), 2004102 (HCIB 5057). HOJASÉN, OJASÉN; GULF CASSIA, DESERT SENNA.
- Sesbania herbacea* (Mill.) McVaugh [In Wiggins as *Sesbania exaltata* (Raf.) Cory] **An, Ph.** RUD: known only from the one specimen in the Mulegé Valley collected in 1964, but not seen during study period. *Howe* 4006 (SD 60871). LA FIBRA, FIBRILLA; BIG-POD SESBANIA, PEATREE.
- * *Tamarindus indicus* L. **Tr.** RP, RUD: occasional tree in local towns and ranches; pods used to make candy and condiments. *Valov* 1219 (SD 260952). TAMARINDO; TAMARIND.
- Tephrosia palmeri* S.Watson **Sh.** SCB-WC, SCB-RH: widespread, common in study area; LC near endemic, where known mainly from lowland areas along the Gulf Coast. *Rebman* 4224 (SD 142407); *Snelling* 99967-2 (SD 107368); *Valov* 2003009 (HCIB 20075), 2004059 (HCIB 20156), 2004129 (HCIB 4489). FRIJOL, EJOTE; PALMER HOARY-PEA.
- Tephrosia tenella* A.Gray **Ph.** SCB-WC, RUD: widespread, common in study area. *Moran* 7472 (SD 69399); *Valov* 2003010 (HCIB 20076), 2004060 (HCIB 20157), 1220 (SD 265630). FRIJOL, EJOTE; SLENDER HOARY-PEA.
- Vachellia brandegeana* (I.M.Johnst.) Seigler & Ebinger [In Wiggins as *Acacia brandegeana* I.M.Johnst.] **Sh.** SCB-WC, SCB-AF, RP: known only from the Mulegé Valley where somewhat common but sporadic; BCS endemic. *Valov* 2010038 (SD 208242). VINORAMA, HUIZACHE, TESO; BRANDEGEE ACACIA.
- Vachellia farnesiana* (L.) Wight & Arnott var. *farnesiana* [In Wiggins as *Acacia farnesiana* (L.) Willd.] **Sh.** SCB, RP, RUD: common and widespread, especially in disturbed soils. *Valov* 2005058 (HCIB 21503), 2005093 (HCIB 21447). VINORAMA, HUIZACHE; SWEET ACACIA.

Fouquieriaceae

- Fouquieria burragei* Rose **Sh.** SCB-RH, SCB-AF: northern limit from at least Km 152 N of Mulegé

then southward, intermittently along Bahía Concepción and along Gulf coast to La Paz and Isla Espíritu Santo. Locally, it is common on the slopes of the Sierra Azteca north of, and above, H. Mulegé, especially the wide alluvial fan between Punta Prieta and Punta Colorado on the north side of Mulegé River. It has also been observed across Bahía Concepción on the northwest coast of the Concepción peninsula, only a few kilometers outside the study area. It was growing there on low, uplifted marine terraces, similar to terraces found almost directly across the bay on the south side of the Mulegé River by El Equipalito where the tree also occurs. When bare and not in bloom, this tree is difficult to distinguish from *F. diguetii* with which it can be found growing on some slopes and alluvial fans. The species is most easily identified by the persistent, usually single inflorescence that tends to project from, or just below, the tip of a branch. In contrast, *F. diguetii* usually has a small number of short, pyramidal inflorescences unequal in length that may arise at the tip and from any node on the branch. Dried flowers with tan, reflexed or curled lobes can sometimes be found on the ground at the base of the plant and will confirm its identification; blooms mainly Jul–Nov, and flowering does not appear to be responsive to winter rains. BCS endemic. *Gallagher 254* (ASU 0030929); *Valov 2004157* (HCIB 22214), *2005196* (HCIB 23215), *2009074* (HCIB). PALO ADÁN, OCOTILLO BLANCO; GULF OCOTILLO, WHITE TREE OCOTILLO.

Fouquieria diguetii (Van Tieghem) I.M.Johnst. **Sh.** SCB, D-R: widespread, common and often abundant; in contrast to *F. burragei*, this species has been observed to bloom in almost any month, and especially after only small amounts of rain or periods of heavy dew. *Valov 2004120* (HCIB 4270). PALO ADÁN; ADAM'S TREE.

Gentianaceae

Centaurium capense Broome **An.** RP: rare in area, known from a few plants in the Mulegé oasis in 2017. BCS endemic, usually occurs in the Cape region and the s Sierra de la Giganta. *Valov 1310* (SD 265633). CAPE CENTAURY.

Eustoma exaltatum (L.) Salisb. ex G.Don subsp. *exaltatum* **Ph, Hf.** RP: rare, known only from two collections, in the Mulegé oasis (1964) and in Boca de Magdalena between Palo Verde and San Bruno (1973). *Howe 4013* (SD 60916); *Gentry 23337* (ASU 0031160). ALKALI CHALICE, CATCHFLY PRAIRIE GENTIAN.

Gratiolaceae

Bacopa monnieri (L.) Wettst. **Ph, Hf.** RP: common along the banks of the Mulegé River in moist soil. *Howe 4017* (SD 60914); *Valov 1039* (SD 218384). BARAIMA; WATER-HYSSOP, HERB OF GRACE.

Schistophragma polystachyum (Brandege) B.L.Turner [In Wiggins as *Conobea polystachya* (Brandege) Minod; syn = *Leucospora polystachya* (Brandege) Minod] **Ph.** SCB-RH, SCB-WC: uncommon; known from around Bahía Concepción; BCS near endemic, found from Sierra Guadalupe southward to Cape. *Moran 9045* (SD 66391); *Valov 2003029* (HCIB 20093), *2003030* (HCIB 20094), *2003031* (HCIB 20095). BAJA CALIFORNIA SPIRALSEED.

Stemodia durantifolia (L.) Sw. var. *durantifolia* **Ph, Hf.** RP: common along the banks of the Mulegé River and the oasis in moist or saturated soil. *Valov 1333* was an unusual white-flowered plant among the typical purple-flowered, with corollas smaller overall and the lobes erect, the herbage very tacky and with minty odor. *Valov 1038* (SD 218388), *1333* (SD 265635). BLUE STREAMWORT, PURPLE STEMODIA, WHITE-WOOLY TWINTIP.

Heliotropiaceae (Luebert et al. 2016)

Heliotropium curassavicum L. var. *oculatum* (A.Heller) I.M.Johnst. ex Tidestr. **Ph, Sc.** RUD, SCB-AS, D-R, CW: widespread and common in a variety of alkaline and disturbed soils. *Daniel 1906* (ASU 0016995); *Knobloch 2332* (SD 94290); *Valov 2004082* (HCIB 1808), *2004183* (HCIB 23887). HIERBA DEL SAPO, RAMITAS DE CHIVA; ALKALI HELIOTROPE.

Hydrophyllaceae

Phacelia crenulata S.Watson var. *minutiflora* (J.Voss ex Munz) Jeps. [In Wiggins as *Phacelia minutiflora* Voss ex Munz] **An.** SCB: rare but known from a few plants in least two locations around Bahía Concepción; Rebman et al. (2016) gives range as only as far south as San Ignacio, BCS. *Daniel 2381* (ASU 0041081); *Valov 1093* (HCIB 27610). RAMA ZORILLA; CLEFT-LEAF PHACELIA.

Phacelia scariosa Brandege **An.** T. F. SCB-WC, SCB-RH: widespread and common, especially abundant in fall and winter after ample summer rain; viscid with a pungent, skunk-like odor. *Daniel 1904* (ASU 0041076); *Valov 2004062* (HCIB), *2004111* (HCIB). RAMA ZORILLA; SOUTHERN MOUNTAIN PHACELIA.

Koeberliniaceae

Koeberlinia spinosa Zucc. var. *tenuispina* Kearney & Peebles [In Wiggins as *Koeberlinia spinosa* (no variety)] **Sh.** SCB-AF: Currently known from one plant along the road to Playa Santa Inés. Distribution and abundance unknown for the study area because when leafless and not in bloom, it is easily overlooked as a young leafless *Parkinsonia microphylla* so it may be more common than realized. Rebman et al. (2016) states that it has a scattered distribution, occurring in s BC and w BCS well north and south of the Mulegé area. *Valov*

1179 (HCIB). JUNCO, CORONA DE CRISTO; CRUCIFICION THORN, CROWN OF THORNS.

(HCIB 24037). CARNAVALITO, UVALAMA; CHAS-TETREE.

Krameriaceae

Krameria erecta Schult. [In Wiggins as *Krameria parvifolia* Benth. var. *parvifolia*, *Krameria parvifolia* var. *imparata* J.F.MacBr., *Krameria parvifolia* var. *glandulosa* J.F.MacBr.] **Sh, Pa** (hemiparasite). SCB-AF, SCB-RH, D-R: widespread, common and occasionally abundant, especially on bajadas; in transition zones between habitats and often occurs alongside *K. paucifolia*. *Gander 9630* (SD 29320); *Valov 2005038* (HCIB 21482), *2005047* (HCIB). MEZQUITILLO, CÓSAHUI; LITTLE-LEAF RATANY, PURPLE HEATHER, PIMA RATANY.

Krameria paucifolia Rose (Rose) **Sh, Pa** (hemiparasite). SCB, D-R, D-F: widespread, common and abundant. Often growing along with *K. erecta*; northern range from around Mulegé and then south to the Cape. *Valov 2004037* (HCIB), *2004039* (HCIB), *2004069* (HCIB), *2004109* (HCIB 23864); *Wiggins 11429* (UC 770228). MEZQUITILLO, CÓSAHUI; GREEN RATANY.

Lamiaceae

Condea anitae (Epling & Játiva) Harley & J.F.B.Pastore [syn = *Hyptis anitae* Epling & Játiva] **Sh**. SCB-RH: small shrub on rocky hillsides around Punta Arena; flowers white, leaves rhomboid to ovoid, canescent, very small. Better known from the Sierra de la Giganta but known as well from rocky slopes around Bahía Concepción (J. P. Rebman, SDNHM, personal communication); BCS endemic. *Daniel 1919* (ASU 0015025); *Gander 9623* (SD 29314); *Gentry 4066* (SD 2037134); *Valov 1123* (SD 260971); *Zippin 1* (SD 130895). SALVIA; CARTER DESERT-LAVENDER.

Condea emoryi (Torr.) Harley & J.F.B.Pastore [In Wiggins as *Hyptis emoryi* Torr. var. *emoryi*, *H. e.* var. *amplifolia* I.M. Jtn., *H. e.* var. *palmeri* (S. Watson) I.M. Jtn.] **Sh**. SCB-WC: widespread, common. *Porter 13839* (BCMEX 12616); *Valov 2004044* (HCIB), *2004047* (HCIB), *2004216* (HCIB 23916), *2004279* (HCIB). SALVIA; DESERT-LAVENDER.

Salvia malvifolia Epling & Játiva **Sh**. SCB-WC: very rare BCS endemic known only from two collections at about 340 meters (above the study area elevation limits) in a rocky canyon west of Playa Los Cocos and Playa el Burro, on Bahía Concepción. *Moran 3940* (SD 50167); *Rebman 35440* (SD 273239). MALLOW-LEAF SAGE.

Salvia misella Kunth **An**. *Valov 1267*. RP: uncommon, known from several small populations observed after 2014 flood in the Mulegé oasis. *Valov 1267* (HCIB). TROPICAL SAGE.

Vitex trifolia* L. **Sh. RUD: ornamental shrub commonly planted as a hedge. *Valov 2008061*

Loasaceae

Eucnide aurea (A.Gray) H.J.Thompson & W.R.Ernst **An**. By far, the majority of plants have deep red (scarlet) flowers. However, the author came across one small population with numerous red-flowered individuals right next to 4–5 orange-flowered individuals that have frequently reproduced since 2004. In 2015, individuals with red, orange and also yellow-green flowers were noted growing together along the same mudstone bank. Red corollas were largest and the limb rotate to reflexed; orange flowers were smaller and the limbs rotate to ascending; yellow-green flowers were the smallest and the limbs ascending to almost erect. SCB-WC, SCB-RH, SCB-CB, RP: widespread, common; the northern limit of this BCS endemic is around Santa Rosalía. *Daniel 1911* (ASU 0023983); *Felger 19977* (ASU 0023977, with orange fls); *Gentry 23177* (DES 00008259); *McGill 57* (ASU 0023978); *Moran 9055* (SD 66274); *Nisbet 41* (DES 00018930); *Valov 2003077* (HCIB 20135, orange fls), *2003078* (HCIB 20136), *2003079* (HCIB 20137), *2004065* (HCIB 20158, orange fls), *2004105* (orange fls), *2004106* (HCIB 23862), *1269a–d* (HCIB, red, orange and yellow fls). PEGA-PEGA; GULF ROCK-NETTLE.

Eucnide cordata Kellogg **Ph**. SCB-WC, SCB-RH, RP, RUD: widespread, fairly common. *Carter 1978* (UC 915794), *2947* (UC 1095099); *Pinkava P-12247* (ASU 0023996); *Rebman 4745* (SD 142225); *Valov 2004007* (HCIB 18019), *2004134* (HCIB), *2005028* (HCIB 23937). PEGA-PEGA; BAJA CALIFORNIA ROCK-NETTLE/STINGBUSH.

Eucnide rupestris (Baill.) H.J.Thompson & W.R.Ernst **An**. SCB-WC: widespread, occasional to common esp. along arroyo beds in sandy, gravelly soil, as well as on the cliffs above; southern range around Bahía Concepción. *Anderson 1064* (UTC 00222492); *Valov 2003080* (HCIB 20138), *2003081* (HCIB 20139), *2004043* (HCIB 20153), *2004104* (HCIB 23861). PEGA-PEGA, FLOR DE LA PIEDRA; ANNUAL ROCK-NETTLE, VELCRO PLANT.

Mentzelia adhaerens Benth. **An**. SCB, RUD: widespread and common, found in variety of habitats; with extremely adhesive properties akin to Velcro and will even stick to skin on fingertips. *Anderson 1074* (UTC 00222456); *Daniel 1898* (ASU 0024069), *2382* (ASU 0024524); *Gallagher 83-15* (ASU 0024070); *Valov 2003019* (HCIB 20085), *2003020* (HCIB 20086), *2003062* (HCIB 20122), *2004057* (HCIB 20155), *2004114* (HCIB 23865); *Van Devender 91-440* (USON 91-440). PEGARROPA, PEGA-ROPA; BAJA CALIFORNIA STICK-LEAF; BLAZING STAR, VELCRO PLANT.

Petalonyx linearis Green **Ph**. SCB-WC: widespread, uncommon. *Carter 2822* (UC 1095097); *Chambers*

787 (UC 10772613); *Rebman* 4746 (SD 142223); *Valov* 2004098 (HCIB), 2005078 (HCIB 23948), 1149 (HCIB). SANDPAPER PLANT, NARROW-LEAF SANDPAPER PLANT.

Loranthaceae

Psittacanthus sonora (S.Watson) Kuijt [In Wiggins as *Phrygilanthus sonora* S.Watson] **Ph, Pa.** SCB: widespread, sporadic; parasitic on *Bursera epinnata*, *B. hindsiana* and *B. microphylla*. *Carter* 1984 (UC 760024), 2946 (SD 48030); *Daniel* 2397 (ASU 0038751); *Valov* 2004006 (HCIB 20601), 2004195 (HCIB 23897), 2004196 (HCIB 22838). TOJ, CHUPONES, INJERTO, MUÉRDAGO; SONORAN MISTLETOE.

Malpighiaceae

Callaeum macropterum (DC.) D.M.Johnson [In Wiggins as *Mascagnia macroptera* (Sessé & Moc.) Niedenzu] **Sh.** SCB-WC: widespread and common within the study area but less so across BCS; especially visible in the many washes along the highway between San Bruno and Palo Verde as well as the Mulegé Valley where it can be a robust woody vine twining within medium to large trees. *Carter* 2820 (UC 1443958); *Daniel* 206 (ASU 0025995), 1918 (ASU 0026000); *Haughey* 256 (SBBG 53380); *Rebman* 4211 (SD 142402); *Valov* 2005193 (HCIB 23189), 2008054 (HCIB 24031). GALLINETA, MATANENE; HILLYHOCK, BUTTERFLY VINE, YELLOW ORCHID VINE.

Cottisia californica (Benth.) W.R.Anderson & C.Davis [In Wiggins as *Janusia californica* (Benth.)] **Ph, Vi.** SCB: occasional around Bahía Concepción. *Valov* 2004011 (HCIB 20599), 2005072 (HCIB 21429), 1308 (SD 265643). CALIFORNIA COTTISIA.

Cottisia gracilis (A.Gray) W.R.Anderson & C.Davis [In Wiggins as *Janusia gracilis* A.Gray] **Ph, Vi.** SCB-WC: common and abundant twining vine often densely covering other shrubs in and along the edges of the numerous small watercourses that cross the large alluvial fan of the Sierra Azteca near Punta Prieta on the north side of the Mulegé River; occasional elsewhere in study area. *Valov* 2005045 (HCIB 21488), 1301 (SD 265642). FERMINA; SLENDER COTTISIA/JANUSIA.

Galphimia angustifolia Benth. [In Wiggins as *Thryallis angustifolia* (Benth.) Kuntze] **Subsh.** SCB: widespread, uncommon. *Daniel* 2393 (ASU 0026268); *Moran* 9037 (SD 66716); *Rebman* 4221 (SD 142401); *Valov* 2004138 (HCIB 20611), 2006055 (HCIB 22828). NARROW-LEAF GOLD-SHOWER.

Malvaceae

Abutilon incanum (Link) Sweet [In Wiggins as *Abutilon pringlei* Hochr.] **Subsh.** SCB-RH, RUD: widespread, sporadic, though can be a common weed in H. Mulegé around habitation. *Valov*

2004151 (HCIB), 2005000 (HCIB 21459), 2005035 (HCIB 21479), 2005043 (HCIB 23942), 1089 (HCIB 27606). PELOTAZO, TRONADORA; HOARY ABUTILON.

Abutilon mollicomum (Willd.) Sweet **Sh.** RP: a rare native previously known only from the Sierra Guadalupe (Rebman et al. 2016), but downstream in the Mulegé oasis, a small population was present for at least two years from 2013 to early 2015. *Valov* 1173 (SD 260973), 1208 (SD 265640). PINTAPÁN CIMARRÓN, PINTAPÁN VISCOSA; SONORAN INDIAN-MALLOW.

Abutilon palmeri A.Gray [In Wiggins as *Abutilon aurantiacum* S.Watson] **Subsh.** *Valov* 2004019 (HCIB 20596), 2005027 (HCIB). SCB: common and widespread. MALVA; PALMER ABUTILON.

Ayenia compacta Rose **Ph.** SCB-AF, SCB-RH: widespread, fairly common but easily overlooked slender perennial that tends to grow within the shade of other shrubs and larger annuals. *Moran* 9039 (SD 66412); *Rebman* 3351 (SD 139156); *Valov* 2005039 (HCIB 21483), 2005052 (HCIB 23945), 1223 (SD 265639). CALIFORNIA AYENIA, DESERT AYENIA.

Gossypium armourianum Kearney **Sh.** SCB-GYP: rare; within the study area known only from specimens in the sw part of Punta Chivato; per Rebman et al. (2016) it is a rare BCS endemic, known only from specimens on Isla San Marcos (adjacent to Punta Chivato), on the mainland just north of Santa Rosalía and the author's collections. Listed as NOM P, CR C2(i). *Valov* 2009006 (SD 192892), 2010052 (SD 208255). ALGODÓN CIMARRÓN; SAN MARCOS COTTON.

Gossypium hirsutum* L. **Ph. RUD: occasional garden ornamental; first specimen originally collected in 2013 from a small plant (apparently an escape) at roadside along the Mulegé River which, as of 2016 has become a large, well-established shrub. A number of other plants are also found in the vicinity and often in vacant lots as well as gardens around town. *Valov* 1204 (SD 265645), 1305 (SD 265646). ALGODÓN; UPLAND COTTON.

Hibiscus biseptus S.Watson **Subsh.** Not found during the study period but observed in SCB adjacent to the study area in the Sierra Guadalupe at above 200 m. *Moran* 9047 (SD 66237). MALVITA; ARIZONA ROSEMALLOW.

Hibiscus denudatus Benth. **Subsh.** SCB-RH, SCB-AF: widespread, common and abundant. *Massey* 48 (2031148), 68 (SD 176816); *Valov* 2003036 (HCIB 20100), 2003037 (HCIB 20101), 2004077 (HCIB), 2004121 (HCIB 23869), 2004197 (HCIB 23899). MALVA BLANCA; ROCK HIBISCUS, ROCK ROSEMALLOW.

Horsfordia alata (S.Watson) A.Gray **Sh.** SCB, RUD: widespread and common, especially in disturbed soils. *De Groot* 4884 (SD 250310); *Valov* 2004020 (HCIB), 2004190 (HCIB 23894). MALVA BLANCA, MALVA REAL, MARIOLA; PINK VELVET-MALLOW, PINK FELT PLANT.

Horsfordia newberryi (S.Watson) A.Gray **Ph.** SCB: widespread, somewhat common, especially in winter after ample summer rains. *Daniel* 1903 (ASO 0036169), 2385 (ASU 0037170); *de Groot* 4878 (SD 250311); *Gallagher* 83-18 (ASU 0036172); *Medel Narváez* 2012-128 (SD 268196); *Sanders* 6390A (UCR 43135); *Valov* 2004024 (HCIB), 2004076 (HCIB), 2004113 (HCIB), 2005006 (HCIB). MARIOLA, MALVA AMARILLA; YELLOW FELTPLANT, ORANGE VELVET-MALLOW.

* *Malva parviflora* L. **An.** RUD, RP: widespread, sporadic weed around habitation and in disturbed soils. *Valov* 2005064 (HCIB 23947). MALVA, QUESITOS; CHEESEWEED, LITTLE MALLOW.

Malvastrum coromandelianum (L.) Garcke **Ph.** RUD: uncommon weed around town in H. Mulegé; apparently rare elsewhere on the peninsula; northern range limit in the Sierra Guadalupe to west of the study area. *Valov* 1031 (SD 218350). ESCOBA BLANCA; THREE-LOBE FALSE MALLOW.

Melochia tomentosa L. var. *tomentosa* [In Wiggins as *Melochia tomentosa* L.] **Sh.** SCB: widespread, common in variety of habitats. *Hastings* 63 311 (SD 56627); *Quirk s.n.* (DES 00022565, Bahía Concepción 1981); *Valov* 2010024 (SD 208256). MALVA ROSA, MALVA DE LOS CERROS; TEA-BUSH, PYRAMID BUSH.

Sida rhombifolia L. **Ph.** RP, RUD: common and abundant in disturbed soils of the Mulegé oasis; northern range limit around Mulegé. *Valov* 2010033 (SD 208257). MALVA, MALVA PRIETA, MALVA DE ESCOBA, MALVILLA; ARROWLEAF SIDA, CUBAN JUTE.

Sphaeralcea ambigua A.Gray **Ph.** SCB, RUD, RP: common and widespread across area; flowers deep orange. *Valov* 2003021 (HCIB 20087), 2003049 (HCIB 20112), 2004115 (HCIB 23866); *Vazquez s.n.* (BCMEX 2564, Bahía Concepción 1986). MALVA, MAL DE OJO; DESERT GLOBE-MALLOW, ORANGE GLOBEMALLOW, APRICOT MALLOW.

Sphaeralcea axillaris S.Watson var. *violacea* (Rose) Wiggins **Ph.** SCB, RUD, RP: common and widespread from at least San Bruno south to H. Mulegé, including the valley; less common to south of town, and not observed around Bahía Concepción; BCS near endemic (one record in BC near Calmallí). *Howe* 4007 (SD 60905); *Sanders* 6375 (UCR 45287); *Valov* 2004041 (HCIB), 2004049 (HCIB). MALVA ROSA; SOUTHERN VIZCAÍNO DESERT MALLOW.

Sphaeralcea coulteri (S.Watson) A.Gray var. *californica* (Rose) Kearney **An.** SCB, RUD, RP: widespread and common; LC endemic. *Reed* 6207 (SD 42891); *Sanders* 6377 (UCR 42791); *Valov* 2004010 (HCIB), 2004029 (HCIB 20598), 2004031 (HCIB), 2004033 (HCIB), 2004048 (HCIB). MALVA, MAL DE OJO; BAJA CALIFORNIA GLOBEMALLOW.

Waltheria indica L. [In Wiggins as *Waltheria americana* L.] **Ph.** RUD: rare; known only from

a few plants in disturbed soil in H. Mulegé. *Valov* 1298 (SD 265647). HIERBA DEL CÁNCER, PAPA-COLA, BASORA PRIETA; UHALOA.

Martyniaceae

Proboscidea althaeifolia (Benth.) Decne. [In Wiggins as *Proboscidea arenaria* (Engelm.) Decne.] **Ph.** SCB-WC, D-R: widespread and sporadic mostly in sandy or loose soils. *Valov* 2009055 (HCIB 27640). ESPUELA DEL DIABLO, CUERNITOS, TORITO; DESERT DEVIL'S CLAW.

Meliaceae

Azadarachta indica* A. Juss. **Tr. RUD: common in towns where it is planted as a shade tree. *Valov per. obs.* (central H. Mulegé, 2014. <https://www.inaturalist.org/observations/38081223>). NIM; NEEM.

Melia azadarach* L. **Tr. RUD: common in towns where it is planted as a shade tree. *Valov* 1314 (SD 265648). PARAÍSO; CHINABERRY.

Molluginaceae

Glinus radiatus* (Ruíz & Pav.) Rohrb. **An. RP, SCB-WC: rare, known only from two small populations along ditch in the Mulegé oasis after 2012 flood; rare elsewhere on peninsula. *Valov* 1189 (HCIB). SPREADING SWEETJUICE, SHINING DAMASCISA.

Mollugo cerviana* (L.) Ser. **An. SCB-WC: uncommon across area, but abundant in the Mulegé Valley after summer rains or floods. *Valov* 2008037 (HCIB 23981), 2009066 (HCIB). THREADSTEM CARPETWEED.

Moraceae

Ficus petiolaris Kunth [In Wiggins as *Ficus palmeri* S.Watson, *Ficus brandegeei* Standl.] **Tr.** SCB-RH (seen only on rocky cliffs of Isla Coyote and high up on a few cliffs and rocky outcrops in the arroyo behind Huerta Don Chano in H. Mulegé). *Valov* 1239 (SD). ZALATE, HIGUERA CIMARRONA/SILVESTRE; BAJA CALIFORNIA ROCK FIG.

Moringaceae

Moringa oleifera* Lam. **Tr, Sh. RUD: common in towns within the study area; fast growing and does well in abandoned areas; increasingly popular ornamental tree used for medicinal purposes. *Valov* 1320 (SD 265649). MORINGA, LA PERLA DEL ORIENTE; HORSERADISH TREE, BEN OIL TREE.

Myrsinaceae

Lysimachia arvensis* (L.) U. Manns & Anderb. **Ph. RUD. Not found during study period. *Sanders*

6380 (UCR 43023). HIERBA DE PÁJARO; SCARLET PIMPERNEL.

Namaceae (Luebert et al. 2016)

Nama coulteri A.Gray. **An.** SCB-WC, RP, SCB-AF, RUD: widespread and common across study area but uncommon elsewhere. *Valov* 2005065 (HCIB 21425), 1148 (SD 260969). COULTER FIDDLE-LEAF.

Nyctaginaceae

Abronia maritima Nutt. ex S.Watson subsp. *maritima* [In Wiggins as *Abronia maritima* (no subspecies)] **Ph.** D-F: uncommon, known from small populations at Playa Santa Inés, the Mulegé Faro, and El Gallito beach. *Daniel* 6777 (SBBG 106947); *Valov* 2010049 (SD 208259), 1374 (SD). ALFOMBRILLA; RED SAND VERBENA.

Allionia incarnata L.var. *villosa* (Standl.) Munz [In Wiggins as *Allionata incarnata* (no varieties)] **Ph.** SCB: widespread and common ground cover, esp. on bluffs and other open areas near the coast. *Thomas* 7966 (SD 49983); *Valov* 2005037 (HCIB 21481), 2005040 (HCIB 21484), 2005051 (HCIB 23944). HIERBA DE LA HORMIGA; TRAILING WINDMILLS, PINK THREE FLOWER, UMBRELLA-WORT.

Boerhavia coccinea Miller **Ph.** RUD, RP: common weedy species esp. around habitation. *Howe s.n.* (SD 60910, Mulegé 1964); *Valov* 2005084 (HCIB 21439), 2005103 (HCIB 21453). HIERBA DE LA HORMIGA, HIERBA PEGAJOSA; RED SPIDERLING.

Boerhavia erecta L. **An.** SCB: uncommon; specimens from along Hwy 1 just north of Mulegé and at Punta Chivato; northern range limit around Mulegé. *Rebman* 3349 (SD 139221); *Valov* 2009052 (HCIB 27637). MOCHITO, MOCHIS, MOCHO; ERECT SPIDERLING.

Boerhavia spicata Choisy **An.** Not found during study period. SCB: uncommon; known from along Bahía Concepción. *Rebman* 4217 (SD 142389). MOCHITO; CREEPING SPIDERLING.

Boerhavia triquetra var. *intermedia* (M.E.Jones) Spellenb. [In Wiggins as *Boerhavia intermedia* M.E.Jones] **An.** SCB, RUD: widespread but uncommon; sporadic after summer rain along Hwy 1 from just north of Mulegé then south to at least Punta Arena and also on dry hillsides in the Mulegé Valley. *Gentry* 4060 (UC 709097); *Rebman* 4218 (SD 142390); *Spellenberg* 13807 (NMC 78278); *Valov* 2008001 (HCIB 23439), 1195 (SD 265651), 1210 (SD 265652), 1211 SD 265650). MOCHITO; FIVE-WING SPIDERLING.

Boerhavia xantii S.Watson **An.** SCB: widespread and common after summer rains. *Spellenberg* 13809 (NMB 78199); *Valov* 2003005 (HCIB 23454), 2003083 (HCIB 20140), 2004161 (HCIB 23879). MOCHITO, ZAMBESANCHE; XANTUS SPIDERLING.

Commicarpus scandens (L.) Standley **Ph.** D-R, RUD: uncommon, sporadic from at least Playa Santa

Inés to El Gallito dunes south of the Mulegé estuary) and in the Mulegé basin. *Valov* 2006057 (HCIB 22830). CLIMBING WARTCLUB.

Onagraceae

Chylismia cardiophylla (Torr.) Small subsp. *cedro-sensis* (Greene) W.L.Wagner & Hoch [In Wiggins as *Camissonia cardiophylla* (Torr.) P.H.Raven subsp. *cedrocensis* (Green) P.H.Raven] **An.** D: uncommon; seen only on a Punta Chivato beach; LC near endemic better known from the Vizcaíno Desert region and Bahía de los Ángeles. *Valov* 1110 (HCIB 27621). CEDROS SUNCUP.

Oenothera curtiflora* W.L.Wagner & Hoch [In Wiggins as *Gaura parviflora* Dougl. ex Hook.] **An. RUD: rare in area and peninsula; known here only from disturbed lot in San Bruno. *Valov* 2010043 (SD 208261). VELVETWEED, SMALL-FLOWERED GAURA.

Oenothera kunthiana (Spach) Munz **An, Hf.** RP: known locally only from the Mulegé oasis in some dry channels and ditches, appearing after the 2012 flood, and persistent there as well as along seeps at the *Ojo* and on the river bank at least through early 2017; rare on the peninsula but commonly occurs in wetlands in the adjacent Sierra Guadalupe. *Valov* 1166 (SD 265655). KUNTH EVENING PRIMROSE.

Orobanchaceae

Castilleja bryantii Brandegees **An, Hf.** RP: known only from a few plants in a dry channel in the Mulegé oasis after the 2012 flood; BCS endemic that occurs in the adjacent Sierra Guadalupe. *Valov* 1172 (HCIB). BRYANT PAINTBRUSH.

Aphyllon cooperi A.Gray subsp. *latilobum* [In Wiggins and Rebman et al. (2016) as *Orobanche cooperi* (A.Gray) A.Heller] **Pa.** SCB: known from just one collection site in the Mulegé Valley on several different *Bebbia juncea* var. *juncea* host plants; southern range limit in the adjacent Sierra Guadalupe. *Valov* 1302 (SD). FLOR DE TIERRA, MAÍZ DE COCHI; DESERT BROOM-RAPE.

Papaveraceae

Argemone gracilentia Greene **An.** SCB-WC, RP, RUD: widespread and common in area, especially in loose, disturbed soils. *Johnston* 3665 (UC 251682); *Valov* 2005041 (HCIB 21485), 2005068 (HCIB 21426). CARDO, CHICALOTE; SONORAN PRICKLY POPPY, COWBOY'S FRIED EGGS.

Passifloraceae

Taxonomy follows Svoboda et al. (2018). *Passiflora arida* (Mast. & Rose) Killip [In Wiggins as *Passiflora arida* var. *cerralbensis* Killip, *Passiflora arida* var. *pentachista* Killip] **Ph, Vi.** SCB: not seen during the study period. *Sanders* 6382 (UCR 43153). This specimen was reviewed in Svoboda

and Harris (2018). ROSAL DE LA PASIÓN, BOLSITA DE LA VIBORA, SANDILLITA, GRANADILLA; SONORAN PASSION FLOWER, DESERT PASSION FLOWER.

Passiflora aff. *fruticosa* Killip **Sh.** SCB-WC: rare; known from a few plants in the Mulegé Valley; BCS endemic with northern limit around Santa Rosalía. *Stone* 1280 (HCIB 9076); *Valov* 2010039 (SD 208262), 1030 (SD 218366). The author's specimens were reviewed in Svoboda and Harris (2018), but they did not make a final determination because the characters were unclear. They did not review Stone's specimen. GRANADILLA, GRANADITOS, SANDILLITA; MAGDALENA PASSION FLOWER.

Passiflora palmeri Rose **Sh.** SCB-WC, SCB-RH: widespread, common and often abundant; LC near endemic. *Baker & Johnson* 8720 (SD 154162); *Daniel* 205 (ASU 0044139T), 1901 (ASU 0044136T); *Gallagher* 83-20 (ASU 0044141); *Rebman* 1722 (SD 137078), 4213 (SD 142386); *Valov* 2003085 (HCIB 20142), 2004101 (HCIB), 2004139 (HCIB 23876); *Wiggins* 5441 (UC 660721). GRANADILLA, SANDÍA DE LA PASIÓN; PALMER PASSION FLOWER.

Passiflora pentaschista (Killip) H.T.Svoboda comb. nov. [In Wiggins as *Passiflora arida* var. *cerralbensis* Killip, *Passiflora arida* var. *pentaschista* Killip; in Rebman et al. (2016) as *Passiflora arida* (Mast. & Rose) Killip] **Ph, Vi.** SCB-WC, SCB-RH: widespread, occasional. *Valov* 2004089 (HCIB 23857), 2004090 (HCIB), 2004100 (HCIB 23860). These specimens were also reviewed in Svoboda and Harris (2018) and placed in this new taxon. ROSAL DE LA PASIÓN, BOLSITA DE LA VIBORA, SANDILLITA, GRANADILLA; SONORAN PASSION FLOWER, DESERT PASSION FLOWER.

Phrymaceae

Erythranthe brevinasuta G.L.Nesom **An, Hf.** RP: rare in the area where known only from a small population within the Mulegé oasis in a moist, shady ditch immediately after the 2012 flood. Occasional in wet areas of adjacent Sierra Guadalupe. *Valov* 1145 (SD 265660). SHORT-TOOTH MONKEY FLOWER.

Erythranthe dentiloba (B.L.Rob. & Fernald) G.L.Nesom [In Wiggins as *Mimulus dentilobus* B.L.Rob & Fernald] **An, Hf.** RP: rare in the area where known only from a few plants within the Mulegé oasis in a moist, shady ditch after 2012 flood. *Valov* 1160 (HCIB). Occasional in wet areas of adjacent Sierra Guadalupe. TOOTH-PETAL MONKEY FLOWER.

Erythranthe floribunda (Lindley) G.L.Nesom [In Wiggins as *Mimulus floribundus* Lindl.] **An, Hf.** RP: rare in the area where known only from intermittent occurrences between 2012 flood and 2017 within the Mulegé oasis in moist, shady areas or in seeps along the *Ojo*. Common in wet areas of adjacent Sierra Guadalupe. *Valov* 1146 (SD

265659). MANY-FLOWERED/PURPLE-STEMMED MONKEY FLOWER.

Phyllanthaceae

Andrachne microphylla (Lam.) Baill. [In Wiggins as *Andrachne ciliato-glandulosa* (Mills.) Croizat] **An.** SCB: uncommon, mainly known from around H. Mulegé, in shade. *Daniel* 1924 (ASU 0026773); *Valov* 2005023 (HCIB 21500), 1299 (SD 265609). SMALL-LEAF ANDRACHNE.

Phyllanthus* sp. **An. RUD: weedy species found in a H. Mulegé garden, possible import from ornamental plants. *Valov* 1334 (SD 265661).

Plantaginaceae

Antirrhinum watsonii Vasey & Rose [In Wiggins as *Antirrhinum kingii* S.Watson var. *watsonii* (Vasey & Rose) Munz] **An, Hf.** RP: uncommon, known from the Mulegé Oasis. *Valov* 1162 (HCIB). WATSON SNAPDRAGON, LEAST SNAPDRAGON.

Plantago major* L. **Ph. RUD: uncommon; known from small population in front garden of the Casa de Cultura in central H. Mulegé. *Valov* 1352 (SD). LLANTÉN MAYOR; COMMON PLANTAIN.

Pseudorontium cyathiferum (Benth.) Rothm. [In Wiggins as *Antirrhinum cyathiferum* Benth.] **An.** SCB: common, widespread and often very abundant. *Daniel* 2380 (ASU 0046799); *Gentry* 23179 (DES 00008521); *Hodgson* 3085 (ASU 0022005); *Thompson* 4217 (UC 1528780); *Valov* 2003004 (HCIB), 2003035 (HCIB 20099), 2004072 (HCIB 18751), 2005007 (HCIB 21465); *Wiggins* 11412 (UC 758684). EMPACHE; CANYON SNAPDRAGON, CORK-SEED SNAPDRAGON, DESERT SNAPDRAGON.

Plumbaginaceae

Plumbago zeylanica L. [In Wiggins as *Plantago scandens* L.] **Ph.** RP: uncommon in area, known only in the Mulegé oasis; more common in sierras to west. *Valov* 1234 (SD 260981), 1254 (SD). HIERBA DEL ALACRÁN, ARETITO; DOCTORBUSH, SUMMER SNOW LEADWORT.

Polygonaceae

Antigonon leptopus Hook & Arn. **Ph, Vi.** RP: rare in area, where known from abandoned orchard west of bridge in the Mulegé oasis and near Bahía Concepción. *Nisbet s.n.* (DES 00018929, c. Bahía Concepción 1979); *Valov* 1207 (SD 265668). SAN MIGUELITO; CORAL VINE, QUEEN'S WREATH.

Eriogonum inflatum Torr. & Frém. [In Wiggins as *Eriogonum inflatum* var. *deflatum* I.M.Johnst.] **Ph.** SCB: widespread, common; all specimens collected were from either ancient seabed formations/bluffs on the coast or in a sandy arroyo near the coast, and presented with slender, un-inflated stems that were gen. no more than 70 cm tall. The first plants seen with inflated stems were in December 2013

(after a very wet summer) in two dense, leafy populations on marine deposits in the arroyo behind Huerta Don Chano. *Valov* 2004128 (HCIB), 2004135 (HCIB 23874), 2004215 (HCIB 23915). GUINAGUA; DESERT TRUMPET.

Polygonum argyrocoleon* Kunze **An. RP: rare in area where known only from a dry channel in the Mulegé oasis; uncommon but widespread elsewhere on peninsula; native to western Asia. *Valov* 1191 (HCIB). ALAMBRILLO; PERSIAN KNOTWEED, SILVER-SHEATH KNOTWEED.

Rumex inconspicuus. Rech.f. **An.** RP: known only from a few plants along bank of the Mulegé River after 2012 flood; rare elsewhere from Sierra de la Giganta and south to Magdalena plain. *Valov* 1163 (SD 261011). Fruits immature but characteristics consistent with this species (J. P. Rebman, SDNHM, personal communication). BAJA CALIFORNIA DOCK.

Portulacaceae

Portulaca californica Legrand **An.** D-R: rare in area, where known only from sandy soils on Playa Punta Arena; an uncommon BCS endemic. *Valov* 1307 (SD 265670). VERDOLAGA; BAJA CALIFORNIA PURSLANE.

Portulaca halimoides L. [In Wiggins as *Portulaca parvula* A.Gray] **An.** SCB-WC: uncommon, but sometimes locally abundant in the Mulegé Valley after summer rains. *Valov* 1066 (SD 265671), 1134 (SD 265672). VERDOLAGA; SILK-COTTON PURSLANE.

Portulaca oleracea* L. [In Wiggins as *Portulaca retusa* Engelm.] **An. RUD, SCB-WC: sporadic in the Mulegé Valley; commonly available for sale as a vegetable. *Valov* 1133 (HCIB), 1203 (SD 265673). VERDOLAGA; COMMON PURSLANE.

Resedaceae

Forchhammeria watsonii Rose **Sh, Tr.** SCB-RH, SCB-WC: known from one small population (4–8 individuals) in H. Mulegé, but more individuals are present southward along Bahía Concepción from around Playa Coyote; Mulegé is the species' northernmost limit. Previously recognized in Capparaceae and placed in Stixaceae by Rebman et al. (2016) but later moved here by Rebman (J. P. Rebman, SDNHM, personal communication). *Stephenson* 336 (SD 94277); *Valov* 1035 (SD 218307); *Webster* 19603 (SD97458); *Zippin* (SD 132122). JITO, PALO SAN JUAN; LOLLIPOP TREE.

Oligomeris linifolia (Hornem.) J.F. Macbr. **An.** SCB-AS, D-R: widespread, uncommon, often but not always in alkaline soils. *Valov* 2005090 (HCIB 21445). TEDDA; NARROW-LEAF OLIGOMERIS, DESERT CAMBESS.

Rhamnaceae

Colubrina viridis (M.E.Jones) M.C.Johnst. **Sh.** SCB,

D-R: widespread, common. *Carter* 1979 (UC 1443987); *Daniel* 1916 (ASU 0032218); *Rebman* 3356 (SD 139190); *Sanders* 6385 (UCR 43155). PALO COLORADO; SNAKEWOOD.

Condalia globosa I.M.Johnst. var. *globosa* **Sh.** D-R, D-F, SCB: Widespread, sporadic. *Valov* 2003026 (HCIB 20091), 2004126 (HCIB). PALO NEGRITO, CASA DE COCHI, SARAMPIÓN; SOUTHERN SNAKEWOOD.

Ziziphus obtusifolia (Torr. & A.Gray) A.Gray var. *canescens* (A.Gray) M.C.Johnst. [In Wiggins as *Condaliopsis lycioides* (A.Gray) Suesseng. var. *canescens* (A.Gray) Suesseng.] **Sh.** SCB, D-R: widespread, sporadic. *Valov* 2004051 (HCIB), 2005073 (HCIB 21430). AMOLE DULCE, BACHATA; WHITE CRUCILLO, GRAYTHORN, LOTE BUSH.

Rhizophoraceae

Rhizophora mangle L. **Sh.** MG: widespread and common but heavily impacted by human activity, especially along the Mulegé River. Listed as NOM A. *Daniel* 1910 (ASU 0032780); *Hastings* 63 308 (SD 56490); *Howe* 4005 (SD 60875); *Reeves* P-12246 (ASU 0032768); *Valov* 2005018 (HCIB 21472). MANGLE ROJO; RED MANGROVE.

Rubiaceae

Stenotis brevipes (Rose) Terrell [In Wiggins as *Houstonia brevipes* Rose; syn = *Hedyotis brevipes* (Rose) W.H.Lewis] **Ph.** SCB-WC, SCB-CB, SCB-RH: common, especially on, but not limited to, patches of marine sediment when inland. *Baker* 8721 (ASU 0043702); *Rebman* 4223 (SD 142380); *Valov* 2003013 (HCIB 20079), 2004112 (HCIB). SAND STAR-VIOLET.

Sapindaceae

Cardiospermum corindum L. **Ph, Vi.** SCB: widespread, common. *Valov* 2006053 (HCIB 22826). TRONADORA, FAROLITOS; BALLOON VINE.

Cardiospermum tortuosum Benth. **Sh.** SCB-WC, SCB-RH: uncommon, known from the Mulegé Valley, its adjacent arroyos, and vicinity of Rancho Año Nuevo; BCS endemic. *Valov* 2009077 (HCIB). TRONADORA; MAGDALENA BALLOON VINE.

Schoepfiaceae

Schoepfia californica Brandegees **Sh.** D-R, SCB: uncommon, known only from around Playa Santa Inés; LC endemic. *Valov* 1095 (HCIB). IGUAJIL, CANDELILLO; CALIFORNIA SCHOEPFIA.

Simaroubaceae

Castela polyandra Moran & Felger **Sh.** SCB, SCB-GYP: known locally only from around road to Santa Inés (Km 152) to Palo Verde; rare LC near endemic with disjunct range, known to occur also

near Bahía de los Ángeles and on Isla San Marcos. *Moran* 8465 (SD 54500); *Valov* 2005108 (HCIB 21509). CHAPARRO AMARGOSO; GULF CRUCIFIXION-THORN.

Simmondsiaceae

Simmondsia chinensis (Link) C.K.Schneider. **Sh.** SCB: widespread and common. *Valov* 2005024 (HCIB 21475). JOJOBA; GOATNUT, JOJOBA.

Solanaceae

Datura discolor Bernh. **An.** SCB: widespread and common in variety of habitats, especially in loose soils, including disturbed areas. *Porter* 13845 (BCMEX 13101); *Valov* 2004066 (HCIB), 2004068 (HCIB), 2004075 (HCIB 26417), 2005013 (HCIB 23935). TOLOACHE; DESERT THORNAPPLE, DESERT DATURA.

Lycium andersonii A.Gray var. *pubescens* S.Watson **Sh.** SCB-AF, SCB-RH, SCB-GYP: widespread and common across area, though not usually in dry watercourses. *Daniel* 2392 (ASU 0049213); *Valov* 2005049 (HCIB 21489). FRUTILLA; HAIRY DESERT THORN.

Lycium brevipes Benth.var. *brevipes* [In Wiggins as *Lycium brevipes* Benth. (no varieties)] **Sh.** D-R, CW, SCB-AS: widespread and common, mainly in alkaline soils near coast in scrub and along margins of wetlands and dunes. *Daniel* 1896 (ASU 0049249); *Rempel* 189 (ARIZ 83546); *Valov* 2004053 (HCIB), 2010048 (SD 208263). FRUTILLA, SALICIESO; COMMON DESERT THORN.

Lycium californicum Nutt ex A.Gray var. *californicum* [In Wiggins as *Lycium californicum* (no varieties)] **Sh.** D-R: uncommon, known locally from beach bluffs north of El Faro and near Cerro El Equipalito. *Valov* 2005085 (HCIB 21440), 2009001 (HCIB). FRUTILLA; CALIFORNIA DESERT THORN.

Lycium fremontii A.Gray var. *fremontii* **Sh.** SCB-WC, RP: common, known mainly from loose, alluvial soils in the Mulegé Valley. *Valov* 1130 (SD 265682), 1135 (SD 265681). FRUTILLA, SALICIESO; FREMONT DESERT THORN.

Nicotiana clevelandii A.Gray [In Wiggins as *Nicotiana greeneana* Vasey & Rose] **An, Hf.** RP: uncommon in area, known only from the Mulegé oasis. *Shreve* s.n. (ARIZ 33561, Bahía Concepción 1935); *Valov* 1159 (HCIB). TABAQUILLO DEL COYOTE; CLEVELAND'S TOBACCO, DESERT TOBACCO.

Nicotiana glauca* Graham **Sh. SCB, RUD: widespread and common, weedlike and invasive in watercourses. *Valov* 2004026 (HCIB), 2004186 (HCIB 23890). LEVÁNTATE DON JUAN, DON JUAN, JUAN LOCO; TREE TABACCO.

Nicotiana obtusifolia M.Martens & Galeotti [In Wiggins as *Nicotiana palmeri* A.Gray, *Nicotiana trigonophylla* Dunal] **An.** SCB-WC, RP, RUD, D-R: widespread and common, especially of dis-

turbed soils. *Valov* 2004070 (HCIB), 2005070 (HCIB 21496). TABAQUILLO; DESERT TABACCO.

Petunia parviflora Juss. [syn = *Calibrachoa parviflora* (Juss.) D'Arcy]. **An, Hf.** RP: rare, known only from the Mulegé oasis where it had become more established as of 2016-17 in wetlands around the Ojo. *Valov* 1168 (HCIB). PETUNIA COSTERA; SEASIDE PETUNIA, WILD PETUNIA.

Physalis crassifolia Benth. var. *crassifolia* [In Wiggins as *Physalis crassifolia* var. *cardiophylla* (Torr.) A.Gray] **An.** SCB: widespread, common. *Daniel* 2383 (ASU 0050884); *Gallagher* 83-17 (ASU 0050878); *Valov* 2003082 (HCIB 20608), 2004001 (HCIB), 2004002 (HCIB), 2004038 (HCIB 20604), 2004063 (HCIB 20609), 2004064 (HCIB). TOMATILLO; THICK-LEAF GROUND-CHERRY.

Physalis pubescens L. **Ph, Hf.** RP: uncommon but abundant in the Mulegé oasis along both dry and damp water channels. *Valov* 1087 (HCIB 27604). TOMATILLO; HAIRY GROUND-CHERRY/TOMATILLO.

Solanum americanum Mill. [In Wiggins as *Solanum nodiflorum* Jacq.] **An, Hf.** RP: uncommon, known only from the Mulegé oasis where it can be abundant. *Valov* 1086 (HCIB 27603). YERBA MORA; WHITE NIGHTSHADE, AMERICAN BLACK NIGHTSHADE.

Solanum elaeagnifolium* Cav. **Ph. RP: uncommon, known only from one site in the Mulegé oasis with a small, persistent population. *Valov* 1029 (SD 230935), 1216 (SD 265685). TROMPILLO; SILVER-LEAF HORSE-NETTLE, WHITE HORSE-NETTLE.

Solanum hindsianum Benth. **Sh.** SCB: widespread and common, especially abundant in disturbed soils. *Valov* 2003072 (HCIB 20130), 2004218 (HCIB 23918). MARIOLA, OJO DE LIEBRE, TOMATILLO ESPINOSO; BAJA CALIFORNIA NIGHTSHADE.

Stegnospermataceae

Stegnosperma halimifolium Benth. **Sh.** SCB: widespread and common in a variety of communities. *Daniel* 1909 (ASU 0044310); *Hodgson* 3108 (ASU 0044314); *Nowak* s.n. (UCR 17620, Bahía Concepción 1979); *Reeves* P-12243 (ASU 0044334); *Valov* 2003088, 2004189 (HCIB). AMOLE, TINTA; BAJA CALIFORNIA STEGNOSPERMA.

Tamaricaceae

Tamarix aphylla* (L.) H.Karst. **Tr, Hf. RUD, RP: widespread as ornamental but some trees beginning to naturalize, spreading in the oasis in areas of high flood disturbance; as of early 2017, new sprouts sporadic almost to the mouth of the estuary. *Valov* 1069 (SD 261018). PINO SALADO; ATHEL, SALT CEDAR, TAMARISK.

Tamarix ramosissima* Ledeb. **Sh. SCB-WC: uncommon across area; a large population noted in the area for the first time in early 2017 in a Punta Chivato arroyo and thought to be confined to a few desert areas; in late 2018 a small population

was unfortunately found by the author in the western part of the Mulegé oasis in a newly innundated section. Larger populations observed outside of the study area around Santa Rosalía, San José de Magdalena, and Tres Vírgenes. *Valov 1311* (SD 265687). PINO SALADO; SALT CEDAR, TAMARISK.

Urticaceae

Parietaria hespera B.D.Hinton var. *hespera* [In Wiggins as *Parietaria floridiana* Benth. misappl.] **An, Hf.** RP: rare; known in area only from two separate collections along the damp banks of the wetlands in the oasis. *Valov 1153* (SD 261019), *1388* (SD). WESTERN PELLITORY, DESERT PELLITORY.

Verbenaceae

Lantana horrida Kunth [In Wiggins as *Lantana velutina* M.Martens & Galeotti] **Sh.** RP, RUD: rare, known only from a few individuals within the Mulegé oasis assumed to have either washed down from native populations in the Sierra Guadalupe or escaped from gardens. *Valov 1255* (SD). CONFITURILLA BLANCA, CONFITURÍA; VELVET-SHRUB VERBENA.

Lippia palmeri S.Watson [In Wiggins as *Lippia palmeri* var. *palmeri*, *Lippia palmeri* var. *spicata* Rose] **Sh.** SCB-RH, SCB-WC: uncommon in study area, where it can be found within a few canyons around H. Mulegé; northern range limit in the Sierra Guadalupe to the west; collected and sold locally as a condiment. *Valov 1240* (SD 265689). ORÉGANO, ORÉGANO DEL MONTE; SONORAN OREGANO, MEXICAN OREGANO.

§ *Phylla nodiflora* (L.) Greene var. *nodiflora* [In Wiggins as *Phylla incisa* Sm.] **Ph.** RUD. Valov personal observation (northside of the Mulegé River around habitation, 2003); not seen since. <https://www.inaturalist.org/observations/38051060> 2003). TURKEY TANGLE FOG FRUIT, GARDEN LIPPIA.

Violaceae

Hybanthus fruticosus (Benth.) I.M.Johnst. var. *fruticosus* [In Wiggins as *Hybanthus fruticosus* (no varieties)] **Ph.** RP: rare, known in area from only one collection in the Mulegé oasis; better known and fairly common from the c Sierra de la Giganta and southward. *Valov 1199* (SD 265691). BAJA CALIFORNIA GREEN-VIOLET.

Viscaceae

Phoradendron californicum Nutt. **Ph, Pa.** SCB: widespread and common parasite, in study area found primarily on *Prosopis* and *Olneya*. *Valov 2004045* (HCIB), *2005015* (HCIB 21469). TOJI,

CHUPONES, INJERTO, MUÉRDAGO; DESERT MISTLETOE.

Zygophyllaceae

Fagonia californica Benth. [In Wiggins as *Fagonia barclayana* (Benth.) Rydb.] **Ph.** SCB-AF, SCB-RH, RUD: common mainly in and around Mulegé basin and several km south towards El Tiburón grade; northern range limit is around Mulegé. *Daniel 1895* (ASU 0047185); *Felger 19984* (ARIZ 188728); *Porter 229* (UC 1225515); *Valov 2004050* (HCIB), *2004219* (HCIB 23919). ROSA DE CASTILLA, CIMARRONA; CALIFORNIA FAGONIA, CALIFORNIA FAGONBUSH.

Fagonia laevis Standl. **Sh.** SCB: widespread and common, often along roadsides, arroyos and hillsides. *Holler s.n.* (DES 00023971, Rancho Coyote 1982); *Valov 2003018* (HCIB 20084), *2004147* (HCIB 22207), *1237* (SD 261020). MANZANILLA; SMOOTH FAGONIA, SMOOTH FAGONBUSH.

Kallstroemia californica (S.Watson) Vail **An.** SCB-WC, SCB-AF: uncommon; known mostly from along Hwy 1 north of Mulegé and in Mulegé Valley after summer rains. *Valov 2009057* (HCIB 27642), *2009058* (HCIB 27643). GOLONDRINA, PELA GALLINA; CALIFORNIA CALTROP.

Larrea tridentata (DC.) Coville var. *tridentata* **Sh.** SCB: widespread, common and abundant. *De Groot 4880* (SD 250370); *Gallagher 256* (ASU 0047301); *Valov 2003089* (HCIB 20145), *2004032* (HCIB 20152), *2004119* (HCIB). GOBERNADORA, HEDIONDILLA; CREOSOTE BUSH, GREASEWOOD.

Tribulus terrestris* L. **An. RUD: widespread and common noxious weed in the area along roadways and around towns, less common elsewhere; easily dispersed by thorny fruits that pierce tires and shoes. *Valov 2005089* (HCIB 21444). CUERNITOS, HUIZAPOL, TORITOS; PUNCTURE VINE, GOAT-HEAD.

Viscainoa geniculata (Kellogg) Greene var. *geniculata* **Sh.** D-R, D-F, SCB-WC: widespread, common, especially in loose, fine soils; LC near endemic. *Daniel 6778* (HCIB 8266); *Valov 2004042* (HCIB 12764), *2005014* (HCIB 21468). GUAYACÁN; VISCAINOA.

VI. Angiosperms: Monocots

Arecaceae

*§ *Cocos nucifera* L. **Tr.** RUD: planted occasionally as ornamental. Valov personal observation (H. Mulegé 2006. <https://www.inaturalist.org/observations/38050362>). COCOTERO; COCONUT PALM.

Phoenix dactylifera* L. **Tr, Hf. RUD, RP: introduced by Spanish missionaries as food crop; planted locally as ornamental and naturalized in the Mulegé oasis. *Krueger 2007-04* (UCR 190239), *2007-05* (UCR 190242), *2007-06* (UCR 190238). DATILERA, DÁTIL; DATE PALM.

Washingtonia robusta H.Wendl. **Tr, Hf.** RP, RUD: widespread and common; native species occurring in the Mulegé oasis that is also planted ornamentally and used for building materials (leaves, trunks). *Valov 2005118* (HCIB 22195). PALMA BLANCA, PALMA NEGRA, PALMA REAL; BAJA CALIFORNIA FAN PALM, WASHINGTON FAN PALM.

Cyperaceae

Cyperus elegans L. **Ph, Hf.** RP: rare overall in area, but occurs abundantly along the Mulegé River banks and at the *Ojo*. *Valov 1037* (SD 230712). TULILLOS, JUNCO; ROYAL FLATSEGE.

Cyperus esculentus L. var. *leptostachys* Boeck. [In Wiggins as *Cyperus esculentus* L. (no varieties)] **Ph, Hf.** SCB-WC: rare in study area where it is known from one dry arroyo in the Mulegé Valley and a small population at the *Ojo*. *Valov 1067* (SD 260857), 1326 (SD 265489). TULILLOS, JUNCO, COQUILLO AMARILLO, CEBOLLÍN; YELLOW NUTSEGE.

Cyperus involucratus* Rottb. **Ph, Hf. RP, RUD: uncommon, known only from the Mulegé oasis near the river and a large population at the sewage containment pond near Punta Prieta in H. Mulegé. *Valov 2004214* (HCIB 23914). TULILLOS, JUNCO; UMBRELLA SEGE, AFRICAN UMBRELLA PLANT.

Cyperus odoratus L. **Ph, Hf.** RP: known in the area only from one collection, but not observed during the study period. *Howe 4041* (SD 60907). TULILLOS, JUNCO; FRAGRANT FLATSEGE, RUSTY FLATSEGE.

Cyperus rotundus* L. **Ph, Hf. RP: rare both in the study area, where it is known only from a large population in the Mulegé oasis, and on the peninsula, where it is found near La Paz. *Valov 1129* (SD 245157); *Wiggins 18062* (DS 507478). TULILLOS, COQUILLO ROJO, PIONIA; COCOGRASS, NUTGRASS, PURPLE NUTSEGE.

Eleocharis geniculata (L.) Roem. & Schult. **Ph, Hf.** RP: uncommon in area where known only from a small population appearing in late 2016 and persisting into 2018 along the Mulegé River at the *Ojo*; more common elsewhere in BCS wet arroyos. *Valov 1300* (SD 265490), 1331 (SD 265491). SAND SPIKE-RUSH, DOMBEY SPIKE-RUSH.

Eleocharis parishii Britton **Ph, Hf.** RP: rare in area, where known only from a new population appearing in 2016 in the freshwater wetlands along the Mulegé River near the *Ojo*; more common in sky islands down the peninsula. *Valov 1318* (SD 265492). PARISH SPIKERUSH.

Schoenoplectus americanus (Pers.) Schinz & R.Keller [In Wiggins as *Scirpus americanus* Pers., *Scirpus olneyi* A.Gray] **Ph, Hf.** RP: uncommon across the study area but relatively abundant within the Mulegé oasis along the river and at the *Ojo*. *Valov*

1164 (HCIB). TULE, TULILLOS; AMERICAN BULRUSH, OLNEY THREESQUARE BULRUSH.

Juncaceae

Juncus acutus L. subsp. *leopoldii* (Parl.) Snog. [In Wiggins as *Juncus acutus*] **Ph, Hf.** CW: rare in study area where known only from two salt flat sites on the south shore of the Mulegé estuary; likely had larger range but extirpated along river due to development; more common to north in BC. *Valov 2008051* (HCIB 24029). JUNCO, ESPADÍN; SOUTHWESTERN SPINY RUSH.

Poaceae

Aristida adscensionis L. **An.** SCB: widespread and common; abundant after summer rains and continuing well into spring. *Valov 2005005* (HCIB 23928), 2006052 (HCIB 22825), 2007084 (HCIB 23949). ZACATE TRES BARBAS, ZACATE LIEBRERO; SIX-WEEKS THREE-AWN.

Aristida californica Thurber var. *californica* [In Wiggins as *Aristida californica* (no varieties), *Aristida peninsularis* Hitchc.] **Ph.** D-R: known from only one collection but may be more widespread in area; infrequent and sporadic across rest of peninsula and adjacent islands. *Valov 1081* (HCIB 27598). ZACATE TRES ARISTAS; CALIFORNIA THREE-AWN.

Aristida ternipes Cav. var. *ternipes* [In Wiggins as *Aristida ternipes* (no varieties.)] **Ph.** SCB: known from one collection along Bahía Concepción, though more common in Sierra Guadalupe to west of town and widespread across BCS. *Rebman 4229* (SD 142481). ZACATE ARAÑA, ZACATE TRES ARISTAS; SPIDER-GRASS.

Arundo donax* L. **Ph, Hf. RP: within the study area it is limited to the Mulegé oasis where it is interspersed with *Phragmites australis*, but it is known from other perennial riparian areas upstream in the Sierra Guadalupe; grows readily and rapidly along the river banks, aiding in their stabilization; the population size varies with flood events; important locally as a building material; worldwide weed native to Europe. *Felger 20056* (ARIZ 20056). CARRIZO; GIANT REED.

Bouteloua aristidoides (Kunth) Griseb. **An.** SCB, D-R: widespread, common; most common grass seed spread via socks in the area; common Spanish name "little knives" is fitting. *Shreve s.n.* (ARIZ 17381, Boca de Magdalena 1935); *Valov 2004178* (HCIB 23883). NAVAJITAS, BANDERITA; NEEDLE GRAMA.

Bouteloua barbata Lag. var. *barbata* [In Wiggins as *Bouteloua barbata* Lag.] **An.** SCB, D-R: widespread and common. *Rebman 4215* (SD 142488); *Shreve s.n.* (ARIZ 17443, 7 mi. N of Mulegé, 1935); *Valov 2004171* (HCIB 23881), 2004179 (HCIB 23883); *Van Devender 91-459* (ASU 0010577). ACEITILLA, NAVAJITAS, NAVAJITA ANUAL; SIX-WEEKS GRAMA.

- **Cenchrus ciliaris* L. [In Wiggins as *Pennisetum ciliare* (L.) Link] **Ph.** RUD, SCB, D: widespread and common; highly invasive, noxious weed; becoming increasingly more common, infiltrating desert zones via roads and trails and aided as well by strong prevailing winds and flashfloods; forms dense monotypic stands along roadsides, sandy washes and disturbed areas; planted for forage in warm, dry climates worldwide. *Rebman* 3347 (SD 139366); *Valov* 2005002 (HCIB 21461). BÚFEL, ZACATE BÚFEL, ZACATE HUIZAPOL; BUFFLEGRASS.
- **Cenchrus echinatus* L. **An.** RUD, SCB-WC: known mostly from the Mulegé Valley basin and connecting arroyos; less common elsewhere in area; native to Mexico, but apparently not the peninsula. *Valov* 2005008 (HCIB 21466). HUIZAPOL, ABROJO, CADILLO; SOUTHERN SANDBUR.
- Cenchrus palmeri* Vasey **An.** D-R, D-F, SCB-WC, RUD: widespread and common; mostly in sandy soils, but also in loose, disturbed soils. *Massey* 67 (UC 2031175); *Porter* 13844 (UCR 168534); *Soule s.n.* (ARIZ 247550, 5.1 m N of Mulegé 1983); *Valov* 2004030 (HCIB 20610), 2005011 (HCIB 21467). HUIZAPOL, ABROJO, CADILLO; PALMER SANDBUR, GIANT SANDBUR.
- Chloris virgata* Sw. **An.** SCB-WC, SCB-AS, D-R: widespread and common, esp. near coast or in alkaline soils. *Valov* 2006048 (HCIB 22821), 2007085 (HCIB). COLA DE ZORRA, ZACATE LAGUNERO; FEATHER FINGERGRASS.
- **Cynodon dactylon* (L.) Pers. var. *dactylon* **Ph.** RUD, SCB, RP: widespread, common weed. *Valov* 2005110 (HCIB 21458). PATO DE GALLO, ZACATE BERMUDA; BERMUDA GRASS.
- **Dactyloctenium aegyptium* (L.) Willd. [In Wiggins as *Dactyloctenium aegypticum* (L.) P.Beauv. (misspelled)] **An.** RUD, D-R: widespread but uncommon in area, mainly in disturbed soils; more common southward. *Valov* 2004181 (HCIB 23885). PATA DE POLLO, ZACATE DE CUERVO; CROWFOOT GRASS.
- Dinebra panicea* (Retz.) P.M.Peterson & N.Snow subsp. *brachiata* (Steud.) P.M.Peterson & N.Snow [In Wiggins as *Leptochloa filiformis* (Pers.) P.Beauv.] **Ph.** SCB-WC: rare in area, known only from one collection in the Mulegé Valley, but may be more widespread. *Valov* 1205 (SD 265501). ZACATE DE ARENA, ZACATE ARENERO, ZACATÓN DESGRANADOR; SAND DROPSEED.
- Disakisperma dubia* (Kunth) P.M.Peterson & N.Snow [In Wiggins as *Leptochloa dubia* (Kunth) Nees.] **Ph.** SCB-WC: uncommon, known in area from few populations in the Mulegé Valley. *Valov* 1128 (SD 260869). ZACATE GIGANTE; GREEN SPRANGLETOP.
- Distichlis littoralis* (Engelm.) H.L.Bell & Columbus [In Wiggins as *Monanthochloë littoralis* Engelm.] **Ph.** CW: widespread and common in salt marshes, estuaries and coastal lagoons. *Valov* 2004088 (HCIB), 2005054 (HCIB 21492). ZACATE SALADO, ZACATE PLAYERO; SALTGRASS, SHOREGRASS.
- Distichlis spicata* (L.) Greene [In Wiggins as *Distichlis spicata* var. *stolonifera* Beetle] **Ph.** CW, MG, SCB-AS, D-R: occasional around saltmarshes and some beaches. *Felger* 19985 (ARIZ 188736); *Van Devender* 91-458 (ASU 0011125); *Valov* 2005195 (HCIB 23214). ZACATE SALADO; SALTGRASS.
- **Echinochloa colona* (L.) Link [In Wiggins as *Echinochloa colonum* spelling variant] **An.** RP, SCB-WC, RUD: uncommon in area, known mainly from the Mulegé Valley and oasis; common in wetlands elsewhere on peninsula. *Valov* 1198 (SD 265502), 1332 (SD 265503). ZACATE RAYADO, ARROZ DEL MONTE; JUNGLE RICE, LEOPARD RICE.
- Enneapogon desvauxii* P. Beauv. **Ph.** SCB-RH, RUD: rare in area where known from only one specimen at edge of old garbage dump north of Mulegé in the Sierra Azteca. *Valov* 1085 (HCIB 27602). ZACATE LADERA, ZACATE LOBERA; NINEAWN PAPPUSGRASS.
- Enteropogon brandegeei* (Vasey) Clayton [In Wiggins as *Chloris brandegeei* (Vasey) Swallen] **Ph.** SCB-CB: known only from a small population of about 30 plants along a rocky bluff near Punta Sueños on Bahía Concepción; LC near endemic. *Valov* 1124 (SD 260871), 1324 (SD 265506). ZACATE CENIZO; BURYSEED UMBRELLAGRASS.
- **Eragrostis cilianensis* (All.) Janch. **An.** SCB-WC, RUD: widespread and common, especially in loose soils. *Valov* 2004223 (HCIB 23923), 2005114 (HCIB 22192), 2006051 (HCIB 22824). ZACATE APESTOSO, AMOR SECO; STINKGRASS, LOVEGRASS.
- Eragrostis pectinacea* (Michx.) Nees var. *pectinacea* **An.** SCB-WC, RP, RUD: widespread and common, especially in loose soils. *Valov* 1127 (HCIB), 1215 (SD 265507). ZACATE LLUVIA; SPREADING LOVEGRASS, TUFTED LOVEGRASS.
- Eriochloa acuminata* (J.Presl) Kunth var. *acuminata* [In Wiggins as *Eriochloa gracilis* (Fourn.) Hitchc.] **An.** SCB-WC, RUD: uncommon across area, but fairly common in the Mulegé Valley and throughout most of BCS. *Valov* 1127 (HCIB), 1215 (SD 265507). ZACATE TAZA; SOUTHWESTERN CUPGRASS, TAPERTIP CUPGRASS.
- § *Jouvea pilosa* (J.Presl.) Scribn. **Ph.** D, CW: large population noted beyond study area about 5 km north of San Bruno around the opening to San Lucas Cove, but could be expected farther south along shore dunes between there and Punta Chivato in less disturbed areas. *Valov* personal observation (San Luquita). ZACATE COSTERO; PACIFIC SALTGRASS.
- Muhlenbergia microsperma* (DC.) Trin. **An.** SCB-WC, SCB-RH, RUD: widespread and common. *Shreve s.n.* (ARIZ 50102, 4 mi. N of Mulegé, 1935); *Valov* 2005115 (HCIB 22193). ZACATE FINITO, LIENDRILLA; LITTLESEED MUHLY.

Panicum alatum Zuloaga & Morrone var. *alatum* **An.** SCB-WC, RUD: uncommon in the area and known only from the Mulegé Valley; commonly cultivated as forage on the peninsula. *Valov 1118* (SD 265522). WING PANICGRASS.

Panicum antidotale* Retz. **Ph. RUD, SCB-WC, RP: Common and abundant bunchgrass in study area, found mainly in the Mulegé basin from the valley to the coast. Most likely began as a livestock forage or contaminant of feed, and has spread rapidly with repeated flooding; uncommon elsewhere on peninsula. *Valov 2003054* (HCIB 21497), *2005057* (HCIB 23946), *2005075* (HCIB 21432), *1200* (SD 265523). PANIZO AZUL; BLUE PANICGRASS.

Paspalum lentiginosum J.Presl. **Ph.** RP: rare on peninsula and not observed during study period. Gould and Moran (1981) note that this may likely be a misidentification and the inclusion in the monograph is based on just one known specimen from a 1964 collection which may instead belong with *P. paniculatum*. *Howe 4008* (SD 112195, near Mulegé, 1964). SPOTTED PASPALUM, CROWN-GRASS.

Paspalum pubiflorum Rupr. ex Fourn. **Ph, Hf.** RP: rare on peninsula and currently known only from a small population around the *Ojo* that was thought to have been extirpated in late 2015 with the construction of the new canal project crossing through the Mulegé oasis. However, it was abundantly present again in almost the exact location as of late 2016 and continued into 2018. *Palmer 45* (SD 122069); *Valov 1171* (SD 260877), *1235* (SD 260876), *1317* (SD 265524). CAMALOTE VELLUDO; HAIRY-SEED KNOTGRASS, CROWN-GRASS.

Phragmites australis (Cav.) Steud. subsp. *berlandieri* (E.Fourn.) Saltonstall & Hauber [In Wiggins as *Phragmites communis* Trin.] **Ph, Hf.** RP: widespread in the Mulegé oasis area, where it is found alongside *Arundo donax*; widespread but uncommon on the peninsula in wetlands and near desert canyon seeps. *Valov 1284* (SD 265525). CARRIZO, CARRICILLO; GULF COAST REED, REED GRASS.

Polypogon monspeliensis* (L.) Desf. **An, Hf. RP: rare in the study area and known only from this collection from one plant growing on a gravel bar in the middle of the river bed after the 2012 flood. *Valov 1187* (HCIB). ZACATE COLA DE ZORRA, PATA DE CONEJO; RABBITFOOT GRASS, ANNUAL BEARDGRASS.

Setaria grisebachii E. Fourn. **An.** SCB-WC: uncommon in area, known only from the Mulegé Valley; more common in mountains from the Sierra San Francisco southward to the Cape region. *Valov 1201* (SD 265528). COLA DE ZORRA, ESPIGUILLA DEL SOL; SUMMER BRISTLEGRASS, GRISEBACH BRISTLEGRASS.

Setaria palmeri Henr. **Ph.** D-R: rare in area, where known only from one specimen from El Gallito dunes; otherwise a widespread BCS endemic.

Valov 1082 (HCIB 27599). PALMER BRISTLEGRASS.

Sorghum bicolor* (L.) Moench. var. *bicolor* [In Wiggins as *Sorghum vulgare* Pers.] **An. RUD: occasional agricultural escape, found mainly along roadsides. *Valov 2006067* (HCIB 24211). MILO MAÍZ, SORGO, SORGO FORRAJERO; SORGHUM, MILO, BROOMCORN.

Sporobolus pyramidatus (Lam.) Hitchc. [In Wiggins as *Sporobolus pulvinatus* Swallen] **Ph.** D-R, CW, SCB-AS: widespread, sporadic in area, mainly in sandy, saline soils along coast; common elsewhere in BCS at lower elevations. *Valov 2003058* (HCIB 20119), *2004172* (HCIB 22221), *1238* (SD 265529). ZACATÓN PYRAMIDAL, ZACATE PYRAMIDAL; WHORLED DROPSEED.

Sporobolus virginicus (L.) Kunth. **Ph.** D-F, D-BS: widespread and common along beaches and margins of coastal wetlands. *Valov 2003064* (HCIB). ZACATE SALADO DE LA PLAYA, ZACATE COSTERO; SEASHORE DROPSEED, BEACH DROPSEED.

Urochloa arizonica (Scribner & Merrill) Morrone & Zuloaga [In Wiggins as *Panicum arizonicum* Scribn. & Merr., *Brachiaria arizonica* (Scribn. & Merr.) S.T. Blake] **An.** SCB, RUD: widespread and common. *Rebman 3348* (SD 139369); *Valov 2007083* (HCIB 22768). PIOJILLO DE ARIZONA; ARIZONA SIGNAL GRASS.

Ruppiaceae

Ruppia maritima L. **Ph, Hf.** CW: uncommon, occasional aquatic native known from small populations in the sandy, subtidal zone at Playas El Requesón and Coyote; expected elsewhere within Bahía Concepción; sporadic elsewhere along both coasts. *Valov 1083* (HCIB), *1319* (SD 265676). DITCH-GRASS, WIDGEONGRASS, BEAD-FRUIT SEA-TASSEL.

Typhaceae

Typha domingensis Pers. **Ph, Hf.** RP: rare in the area; increasingly common along the Mulegé River near the *Ojo*; a large population also present at the sewage containment pond near Punta Prieta in H. Mulegé. *Valov 1259* (HCIB). TULE, TULE PETA-TERO; SOUTHERN CATTAIL.

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APPENDIX 1

COORDINATES OF STUDY AREA LOCATIONS

Coordinates are of areas mentioned in the text and checklist, are arranged alphabetically, and are for locating a general named area; they do not correspond to any particular specimen collection location. Source: Google Earth (Google Earth v. 4.3–7.0, Google Earth Pro v. 7.3.2, Google, Inc., Mountain View, CA). Areas associated with Punta Chivato are indicated with (PC) after their name.

Location name	Latitude	Longitude
Boca de Magdalena	27.069456	–112.11128
Boca el Mojón (PC)	27.02448	–112.01066
Colonia El Cacheno	26.89384	–111.95842
Colonia Loma Azul	26.90329	–111.96137
Dolphin Cove (PC)	27.11662	–112.01361
El Equipalito	26.89647	–111.95527
El Faro	26.90157	–111.95344
El Frijól	26.65634	–111.85094
El Gallito	26.87611	–111.91737
El Ojo (de Agua)	26.88456	–111.99162
El Rastro	26.87711	–111.99145
El Tiburón grade (highway summit)	26.84328	–111.90903
Ensenada el Muerto (Deadman’s Cove, PC)	27.094834	–111.98529
Estero San Marcos (PC)	27.12281	–112.05574
Huerta Don Chano	26.89827	–111.97404
Isla San Marco	27.21622	–112.0775
La Ventana	26.87506	–112.00225
Las Plumas	26.90595	–112.01404
Oasis (center)	26.88578	–111.99020
Oasis (w side; new wetland)	26.88688	–111.99945
Orchard by bridge (center)	26.88755	–111.98483
Palo Verde	27.0306	–112.08671
Playa Armenta	26.6247	–111.80930
Playa El Burro	26.73052	–111.90734
Playa El Coyote	26.72051	–111.90946
Playa El Requesón	26.63785	–111.83203
Playa La Perla	26.63474	–111.82490
Playa Los Cocos	26.74300	–111.90029
Playa Los Lobos	26.81750	–111.87195
Playa Punta Arena	26.77797	–111.87458
Playa Santa Inés	26.98762	–112.01696
Playa Santispac	26.76568	–111.88720
Punta Cacarizo (PC)	27.07088	–111.94583

Punta Cerrotito (PC)	27.07878	–111.94579
Punta Chivato	27.09628	–111.95327
Punta Colorado	26.92638	–111.97045
Punta Mezquitito (PC)	27.06523	–111.95873
Punta Prieta (gen. area)	26.91175	–111.95884
Punta Ranchero	27.11973	–112.0187
Punta Sueños	26.80515	–111.86380
Rancho Año Nuevo	26.88920	–112.05020
San Bruno	27.16221	–112.17276

APPENDIX 2

TAXA WARRANTING FURTHER STUDY

I. Eighteen taxa with historical vouchers that were not seen during the study period (2003–2019). See Checklist for more information.

Taxon
<i>Aristida ternipes</i>
<i>Bebbia juncea</i> var. <i>aspera</i>
<i>Boerhavia spicata</i>
<i>Celosia floribunda</i>
<i>Ceratophyllum demersum</i>
<i>Cnidoscolus palmeri</i>
<i>Coulterella capitata</i>
<i>Cryptantha maritima</i>
<i>Cyclospermum leptophyllum</i>
<i>Cyperus odoratus</i>
<i>Euphorbia capitellata</i>
<i>Eustoma exaltatum</i>
<i>Gutierrezia ramulosa</i>
<i>Hibiscus biseptus</i>
<i>Lysimachia arvensis</i>
<i>Notholaena californica</i>
<i>Paspalum lentiginosum</i>
<i>Sesbania herbacea</i>

II. Seven taxa without vouchers. These were observed and photographed by the author within the study area, or occurred just outside of it but are expected to occur within it as well. Six ornamentals plants are not listed here.

Taxon
<i>Bourreria sonorae</i>
<i>Cyrtocarpa edulis</i>
<i>Ipomoea hederacea</i>
<i>Jouvea pilosa</i>
<i>Mammillaria hutchisoniana</i>
<i>Opuntia</i> sp.
<i>Stenocereus thurberi</i>

APPENDIX 3

LIST OF EXCLUDED TAXA

The following taxa were reported from the area, but have been excluded due to likely misidentification or incorrect location that places them outside the study area.

Angiosperms: Eudicots

Amaranthaceae

Amaranthus pringlei S.Watson [syn = *A. torreyi* (A.Gray) S.Watson]. *Anderson 1067* (UTC 00222453).

Apocynaceae

Asclepias californica Greene. *Palmer s.n.* (UC 22949, Mulegé, Gulf of California,1887). Location incorrect (J. P. Rebman, SDNHM, personal communication).

Asteraceae

Chaenactis heterocarpha Torr. & A.Gray ex A.Gray. *Palmer 14* (NY 366852).

Pectis multiseta var. *ambigua* (Fernald) Keil. Reported from study area, but not observed during study; may be misidentification (J. P. Rebman, SDNHM, personal communication). *Sanders 1959* (UCR 29664). Rare; BCS endemic, known mainly from San Juanico (on Pacific coast south of San Ignacio) to the Cape.

Burseraceae

Bursera cerasifolia Brandegees. Determined to be *B. hindsiana*. *Holler s.n.* (DES 00023945, Playa Coyote 1982).

Ehretiaceae

Tiquilia palmeri (A.Gray) A.T. Richardson [syn = *Coldenia palmeri* A. Gray]. Likely *T. cuspidata*. *Porter 13841* (BCMEX 12615).

Namaceae

Nama hispidum A.Gray. Likely *N. coulteri*. *Sanders 6379* (UCR 43022).

Tiquilia palmeri (A.Gray) A.T.Richardson [syn = *Coldenia palmeri* A.Gray]. Likely *T. cuspidata*. *Porter 13841* (BCMEX 12615).

Solanaceae

Lycium torreyi A.Gray. Likely *L. brevipes* var. *brevipes*. *Hodgson 3091* (DES 00027518, Playa Coyote).

Angiosperms: Monocots

Poaceae

Muhlenbergia minutissima (Steud.) Swallen. Likely *M. microsperma*. *Anderson 1063*.

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